September 30, 1998

Remedial Action Report

Shenandoah Stables
Lincoln County, Missouri

Operable Unit 02
Final Destruction

I. INTRODUCTION

This Remedial Action Report documents that the objectives of the Operable Unit number 2 Remedial Action for the Shenandoah Stables site have been in accordance with *Close Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-09). This remedial action was conducted through a *mixed work* settlement between EPA, the State of Missouri, and the settling defendants pursuant to a Consent Decree entered In U. S. District Court, Eastern District of Missouri, on December 31, 1990.

Background

The Shenandoah Stables facility is located in a rural area along highway US-61 near Moscow Mills, Lincoln County, Missouri, approximately 35 miles northwest of St. Louis, Missouri. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation and other small businesses on approximately 5- to 10-acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

During the early 1970's, activities at Shenandoah Stables included the boarding, training and sale of horses, and the staging of horse shows. Children periodically played in the arena building. Historical records indicate that the indoor arena was sprayed with 1500 gallons of dioxin-contaminated waste oil to control dust on May 26, 1971.

Following the spraying of contaminated waste oil, a number of adverse effects were noted in horses, other animals, and in humans. In August of 1971, the facility owner reportedly removed 6 to 8 inches of the contaminated arena soil from the indoor arena. This material was used as fill for a portion of U.S. Highway 61, which was under construction at the time. Horses continued to die after this initial excavation. In March 1972, an additional 18 inches of materials were reportedly removed by the site owner from the arena area and buried in a slough area about 75 feet southeast of the arena structure.

Investigation into the disposal practices of a southwestern Missouri chemical manufacturing facility led EPA to the Bliss Waste Oil Company and subsequently to a number of sites that had potentially been sprayed with dioxin-contaminated waste oil for dust control, including the Shenandoah Stables site. Initial sampling of the site in May, 1982 showed 2,3,7,8-tetrachlorodibenzo-p-dioxin (dioxin) levels as high as 1750 parts per billion. In 1984 an article was published by a toxicologist with the Centers for Disease Control, Center for Environmental Health (CDC), recommending 1 ppb as a level of concern for dioxin in residential soils. In January, 1987, EPA proposed cleanup levels to the CDC for the excavation of the eastern Missouri dioxin sites, including Shenandoah Stables. The CDC concurred with the Agency's proposed cleanup levels.

The Shenandoah Stables Site was proposed for the National Priorities List on December 30, 1982 and finalized on the NPL September 8, 1983.

A Record of Decision (ROD) for interim action at the Shenandoah Stables site was issued by EPA on July 28, 1988. This remedy was implemented using the EPA emergency response contract, and required issuance of an action memorandum for mobilization in accordance with contract requirements. The interim remedy involved excavation and onsite storage of dioxin-contaminated soils pending final management. In areas outside the arena, excavation continued until a residual concentration of one part per billion (ppb) was reached in the top 12 inches of soil, or until a residual level of less than 10 ppb was reached at a depth greater than 12 inches. In the arena and slough area, excavation continued until a residual concentration of less than one ppb was reached in the upper two feet of soil, or until a concentration of less than 10 ppb was reached at depths greater than two feet. During this remedial action, decontamination of the arena building was performed to meet criteria recommended by the Missouri Department of Health and the Agency for Toxic Substances and Disease Registry (ATSDR). Ambient air monitoring was performed during all phases of earth-disturbing activities to assure that implementation of the remedial action did not result in a further release of contaminated materials. Implementation of this remedial action was completed in May, 1989. A total of 6,418 tons of dioxin-contaminated materials resulting from soil excavation and building decontamination were containerized in bulk storage sacks and placed inside wood-framed, steel sided storage structures constructed onsite pending final management.

On September 29, 1988, a Record of Decision was signed by the Assistant Administrator, OSWER, that provided for a temporary incinerator to be located at Times Beach for the treatment of dioxin-contaminated materials from Times Beach and the Minker/Stout/Romaine Creek sites. The ROD further provided that the temporary incinerator would be available to treat

dioxin-contaminated materials from the other eastern Missouri sites, if subsequent remedy selections were made for those sites that included offsite thermal treatment. A ROD was signed for the Shenandoah Stables site on September 28, 1990 that selected offsite thermal treatment of dioxin-contaminated materials at Times Beach as a component of the remedy.

On December 31, 1990, a Consent Decree was entered in the Eastern District of Missouri between EPA, the State and the settling defendants. The Consent Decree provided for a *mixed work* settlement that requires each party to undertake certain tasks. Generally, EPA was responsible for excavation and transportation of dioxin-contaminated soils from twenty-six other eastern Missouri dioxin sites, including Shenandoah Stables, to Times Beach for incineration. The settling defendants were responsible for construction of a temporary incinerator at Times Beach and incineration of dioxin-contaminated materials from the twenty-seven sites (including Shenandoah Stables).

II. CHRONOLOGY OF EVENTS

July 28, 1988	EPA Record of Decision for excavation and interim storage of dioxin-contaminated materials at the Shenandoah Stables site
September 29, 1988	EPA Record of Decision for final management of dioxin-contaminated materials at the Times Beach site
October, 1988-February, 1989	Excavation of dioxin-contaminated materials and interim on-site storage
September 28, 1990	EPA Record of Decision for final management of dioxin-contaminated materials at the Shenandoah Stables site
December 31, 1990	U.S. District Court enters Consent Decree providing for mixed-work settlement implementing Times Beach Record of Decision
March 16, 1996	Operation of the thermal treatment unit at Times Beach begins
August 15, 1996	State Superfund Contract finalized
August 26, 1996	Delivery of dioxin-contaminated materials from Shenandoah Stables site to Times Beach for final management begins
October 1, 1996	Delivery of dioxin-contaminated materials from Shenandoah Stables site to Times Beach for final management completed
June 16, 1997	Operation of the thermal treatment unit at Times Beach completed
April 3, 1998	Certification of Completion issued for Times Beach Consent Decree

III. PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

This remedial action is a component of a comprehensive response program addressing contamination at twenty-seven eastern Missouri sites. The EPA, the State of Missouri, and the settling defendants are responsible for the implementation of separate components of this comprehensive response in accordance with a 1990 Consent Decree. The remedial action described in this Remedial Action Report was selected by EPA in a September 28, 1990 Record of Decision for the Shenandoah Stables site. The December, 1990 Consent Decree assigned responsibility to EPA for removal of dioxin-contaminated materials in storage at the Shenandoah Stables site, and transportation to Times Beach. The 1990 Consent Decree assigned responsibility for thermal treatment of these materials to the settling defendants.

An EPA On-Scene Coordinator (OSC) managed implementation of this Remedial Action. This OSC tasked the EPA response contractor to conduct remediation activities in accordance with the ROD and the1990 Consent Decree. The EPA OSC provided full-time oversight during implementation of all site activities conducted as part of this remedial action at the Shenandoah Stables site.

Thermal treatment of dioxin-contaminated materials was performed in accordance with a joint permit issued by the Missouri Hazardous Waste Program (Part 1) and the EPA (Part 2). The EPA's portion of the permit was limited in scope to permitting requirements under newly developed regulations for containment structures. Implementation of these containment structure regulations had not yet delegated from EPA to the State, therefore EPA was responsible for permitting containment structures at Times Beach.

Operation of the incinerator was controlled by the Missouri Hazardous Waste Management Permit. A description of operational controls and monitoring requirements provided for by the State permit for the thermal treatment unit is beyond the scope of this Remedial Action Report. This information is available in files maintained by the Missouri Department of Natural Resources, Division of Environmental Quality. Also available in State files are records of operational parameters monitored during incineration of dioxin-contaminated materials from the eastern Missouri dioxin sites, including the Shenandoah Stables site.

Land disposal of treated materials at Times Beach was subject to criteria established through a delisting procedure approved by EPA Region 7. Modeling studies demonstrated that treated materials could be safely land disposed in designated cells within site boundaries if residual 2,3,7,8-TCDD concentrations were less than 1 part per billion. In addition, delisting criteria were established for designated organic and inorganic constituents. The 1990 CERCLA Exclusion for Times Beach Thermal Treatment Residues describes the process and basis for establishing criteria for land disposal at Times Beach, and is incorporated into this Remedial Action Report by reference. Analytical results demonstrating compliance of treated materials from the Shenandoah Stables are presented in Section V of the Notice of Completion Engineering Report for Shenandoah Stables Site, which is presented as Attachment 1 to this Remedial Action Report. This engineering report also 1) describes the management of Shenandoah Stables site materials at

the Times Beach site, 2) references all documents establishing criteria for implementation of Times Beach activities, 3) Certifies that management of Shenandoah Stables site materials was in compliance with all referenced documents, 4) describes the process and provides the data that is generated to track management of materials from the Shenandoah Stables site, 5) documents that a quality assurance review of the Shenandoah Stables site data has been completed, and 6) cross-references truck manifests to scale tickets.

Implementation of the EPA's portion of work was performed utilizing a service contract for the excavation and transportation of dioxin-contaminated materials competitively awarded to Earth-Tech, Inc. This contract was specifically developed and solicited to provide support for EPA's responsibilities under the 1990 Consent Decree. The contractor was tasked through a delivery order to remove containerized dioxin-contaminated materials from three storage buildings at the Shenandoah Stables site and transport these materials to the thermal treatment facility at Times Beach. The work was performed under the oversight of an EPA on-scene coordinator, in accordance with terms and provisions of the Earth-Tech contract.

Following removal of containerized dioxin-contaminated materials, decontamination of storage structures was performed by initial sweeping followed by high-pressure washing. Wipe samples were collected from the interior surfaces and analyzed for 2,3,7,8-TCDD in accordance with a Quality Assurance Project Plan (QAPP) developed for structure decontamination. This QAPP is included in the removal response files maintained at the Regional Superfund Records Center. Decontamination was considered successful if wipe sampling results were less than 4 picograms per square centimeter. This criteria was also applied to equipment and vehicles following use in contaminated areas.

Dioxin-contaminated materials were transported to the thermal treatment facility at Times Beach in accordance with the Transportation Work Plan attached to the Consent Decree. Transported materials were manifested by load. Trucks were properly placarded. Both transport vehicles and drivers complied with State and Federal requirements for transporters of hazardous wastes.

Ambient air monitoring was conducted during excavation and loading activities at the Shenandoah Stables site. Samples were collected with standard Hi-Vol samplers fitted with both glass-fiber filters and polyurethane foam (PUF) filters over a 72-hour duration. Analytical results were compared to primary criteria of less than 3.0 picograms per cubic meter averaged over fourteen consecutive data points, and a secondary criteria of less than 5.5 picograms per cubic meter for any single data point. This data is available in the removal response program files maintained at the EPA Region 7 Superfund Records Center.

Table 1 summarizes the performance criteria applied to implementation of this remedial action at the Shenandoah Stables site.

Table 1. Performance Standards for Remedial Action			
Performance Standard	Media	Analyte	Criteria
Excavation	soil	2,3,7,8-TCDD rapid turnaround 0.3 ppb detection limit	less than 1 ppb within 1 foot of surface less than 10 ppb at depths greater than 1 foot
Thermal treatment wastewater	Incinerator process water	2,3,7,8-TCDD	less than 10 ppt
Solid residues (treated materials, GCS particulates)	Solid treatment residuals	PAH's	2,3,4-trichlorophenol - 100 ppm 2,4,5-trichlorophenol - 100 ppm 2,4,6-trichlorophenol - 10 ppm 2,5-dichlorophenol - 100 ppm 3,4-dichlorophenol - 100 ppm 2,3,4,5-tetrachlorophenol - 10 ppm 2,3,4,6-tetrachlorophenol - 10 ppm 1,2,4,5-tetrachlorobenzene - 100 ppm 1,2,3,5-tetrachlorobenzene - 100 ppm Hexachlorphene - 200 ppm Benz(a)pyrene - 50 ppm Benz(a)anthracene - 50 ppm Chrysene - 50 ppm Dibenzo(a,h)anthracene - 50 ppm Indeno(1,2,3-c,d)pyrene - 50 ppm benz(b)fluoranthene - 50 ppm

Table 1. Performance Standards for Remedial Action			
Thermal treatment wastewater	Incinerator process water	PAH's	2,3,4-trichlorophenol - 10 ppm 2,4,5-trichlorophenol - 10 ppm 2,4,6-trichlorophenol - 50 ppb 2,5-dichlorophenol - 10 ppb 3,4-dichlorophenol - 10 ppm 2,3,4,5-tetrachlorophenol - 50 ppb 2,3,4,6-tetrachlorophenol - 50 ppb 1,2,4,5-tetrachlorobenzene - 10 ppm 1,2,3,5-tetrachlorobenzene - 10 ppm Hexachlorphene - 5 ppm Benz(a)pyrene - 10 ppm Benz(a)anthracene - 10 ppb Chrysene - 1 ppm Dibenzo(a,h)anthracene - 10 ppb Indeno(1,2,3-c,d)pyrene - 10 ppb benz(b)fluoranthene - 10 ppb
Thermal treatment wastewater and solid treatment residue	Incinerator process water and solid incinerator residuals	Hazardous waste characteristics	Ignitability Corrosivity Reactivity Toxic Characteristics Metals Arsenic - 5.0 mg/l Chromium - 5.0 mg/l Silver - 5.0 mg/l Barium - 100 mg/l Cadmium - 1 mg/l Selenium - 1 mg/l Mercury - 0.2 mg/l
Hi-Vol ambient air monitoring during excavation	Glass fiber filter/polyurethane foam (GFF/PUF)	2,3,7,8-TCDD rapid turnaround 0.3 ppb detection limit	Primary: less than 3.0 pg/dscm average over 14 consecutive data points (72-hr samples) Secondary: less than 5.5 pg/dscm for single samples

Table 1. Performance Standards for Remedial Action			
Hi-Vol ambient air monitoring during incineration	Glass fiber filter/polyurethane foam (GFF/PUF)	2,3,7,8-substituted dioxin and furan congeners converted to dioxin toxic equivalents (TEQ)	Primary: less than 3.0 pg/dscm TEQ average over 14 consecutive data points (72-hr samples) Secondary: less than 5.5 pg/dscm TEQ for single samples
Equipment Decontamination	Wipe sample	2,3,7,8-TCDD rapid turnaround 0.3 ppb detection limit	Less than 4.0 pg/square centimeter
Structure decontamination	Wipe sample	2,3,7,8-TCDD rapid turnaround 0.3 ppb detection limit	Less than 4.0 pg/square centimeter

Final remediation of the Shenandoah Stables site materials was completed consistent with the 1990 Record of Decision and the 1990 Consent Decree. Approved EPA sampling and analytical methods were used for all media sampling, including soil, water, dust, wipe, and ambient air sampling. All EPA analytical procedures were performed using Regional personnel, Regional analytical contracts, the Contract Laboratory Program, or special contracts awarded by EPA to provide rapid-turnaround dioxin analysis.

IV. CONSTRUCTION ACTIVITIES

As noted above, the components of this remedial action assigned to EPA by the Consent Decree were implemented through the EPA response contractor. An EPA OSC provided full-time oversight for response activities conducted at the Shenandoah Stables site. The EPA OSC prepared a series of Site Progress Reports during the remedial activities performed at the site. These Site Progress Reports are presented as Attachment 2 to this Remedial Action Report.

Additional soil sampling was performed by EPA at the Shenandoah Stables site concurrent with the final remedial action, upon recommendation from ATSDR, to determine if the initial excavation had achieved the cleanup criteria for a specific area. As a result of this sampling, an additional 34 tons of contaminated soil was excavated and transported to Times Beach for treatment during the final remedial action. Transportation of contaminated materials from the Shenandoah Stables site to Times Beach site commenced on August 26, 1996 and was completed October 1, 1996. A total of 6,452 tons of dioxin-contaminated materials from the Shenandoah Stables site was transported to Times Beach for incineration. Following removal of contaminated materials from interim storage, the three storage buildings were decontaminated by pressure

washing and sampled. The storage structures were left onsite and are being abandoned as excess government property. Site restoration at Shenandoah Stables was completed following decontamination of the storage structures in October, 1996. No land use restrictions are necessary, and institutional controls will not be imposed on the property.

Dioxin-contaminated materials from the Shenandoah Stables site were transported to Times Beach by the EPA response contractor, and delivered to the Times Beach thermal treatment facility inside a Feedstock Handling Building operated under negative pressure to control fugitive emissions. Implementation of activities at Times Beach, including mobilization and operation of the temporary incinerator, was performed by the settling defendants in accordance with the December, 1990 Consent Decree. The settling defendants awarded a contract for the temporary incinerator to IT Corporation in September, 1992. Initial testing of the incinerator was performed in December, 1995. Full-scale operation of the incinerator commenced on March 17, 1996 and was completed June 16, 1997. A total of 265,354 tons of dioxin-contaminated materials from the 27 eastern Missouri dioxin sites were treated and disposed at Times Beach, including 6,452 tons of materials from Shenandoah Stables. A Certification of Completion for the Shenandoah Stables site was issued to the settling defendants by EPA on August 15, 1997, in accordance with provisions of the 1990 Consent Decree.

An ambient air monitoring network was operated throughout the incineration of dioxin-contaminated soils at Times Beach. The network included four onsite and two offsite monitoring stations incorporating seventeen monitors measuring ambient dioxin and PM-10 levels. The air monitoring demonstrated that there was no discernible increase in airborne dioxin or PM-10 levels at Times Beach resulting from implementation of the remedial action.

V. FINAL INSPECTION

EPA and the Missouri Department of Natural Resources (State) conducted a pre-final inspection on October 10, 1996. During the pre-final inspection, EPA and the State determined that the EPA components of the remedial action had been performed by EPA response contractors in accordance with the December 31, 1991 Consent Decree, Work Plans and Quality Assurance Project Plans for the site. EPA and the State further determined during the pre-final inspection that State and PRP components of the remedy had been performed in accordance with the December 31, 1991 Consent Decree.

VI. CERTIFICATION THAT REMEDY IS OPERATIONAL AND FUNCTIONAL

All performance standards for the Remedial Action described in this report and referenced in the Notice of Completion Engineering Report have been achieved. Confirmation sampling has demonstrated that contaminated materials exceeding health-based standards have been removed from remediated areas of the Shenandoah Stables site. EPA has no information that would indicate the presence of additional contamination exceeding health-based levels at the site.

Testing of treatment residuals prior to land disposal at Times Beach demonstrated compliance with the site-specific exclusion criteria approved by EPA.

VII. OPERATION AND MAINTENANCE

Following completion of the Remedial Action, no hazardous substances above health-based levels remain at the site. For this reason, there no operation and maintenance requirements that must be implemented to maintain the effectiveness of the remedy.

VIII. SUMMARY OF PROJECT COSTS

The Remedial Action was implemented in accordance with a mixed-work agreement between EPA, the State of Missouri, and the Settling Defendants. This mixed-work agreement required parties to perform or provide for certain components of the work, without regard for the cost involved. Cost information is available for the components of the Remedial Action performed by EPA. However, the settling defendants were not required by the consent decree to provide cost information for their work performed, and this information was not volunteered. Therefore, cost information for the Remedial Action is limited to work performed by EPA.

EPA costs for removal of dioxin-contaminated materials from the storage structures, transportation to the Times Beach thermal treatment facility, decontamination of storage structures, and restoration of the site total $199,750. These costs are broken out in the attached final Site Progress Report.

Approved:

Steve A. Kovac
Chief, Missouri/Kansas Branch
Superfund Division

9/30/98
Date

Attachments

Appendix 1

Notice of Completion Engineering Report
for
Shenandoah Stables

EXHIBIT B

Eastern Missouri Dioxin Sites
Times Beach Remediation Project

Notice of Completion Engineering Report
For
Shenandoah Stables

United States, v. Russell Martin Bliss, et al.
Consent Decree and Final Order
Attachment A, List 1 - Site No. 23

EXHIBIT B

FOSTER WHEELER ENVIRONMENTAL CORPORATION

EASTERN MISSOURI DIOXIN SITES
TIMES BEACH REMEDIATION PROJECT

Notice of Completion Engineering Report
For
Shenandoah Stables

United States, v. Russell Martin Bliss, et al.
Consent Decree and Final Order
Attachment A, List 1 - Site No. 23

Prepared For:

Syntex Corporation, Syntex Agribusiness, Inc., Syntex Laboratories and Syntex USA (Inc)

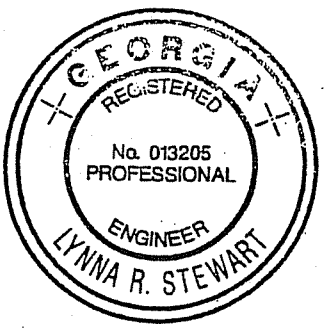
(May 1997)

I certify that this Notice of Completion Engineering Report (Exhibit B) was prepared under my direction or supervision and that it is to the best of my knowledge and belief, true, accurate and correct.

L R Stewart

Lynna R. Stewart, P.E.

Date: May 1997
Missouri P.E. License No. E-26966



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Revision:	Date:	Prepared By:	Approved By:	Section Affected:
1	6/10/97	GM Clark	L Stewart	I,IV

Section I

- Summary of Thermal Treatment Activity -

SUMMARY OF THERMAL TREATMENT ACTIVITY

The Shenandoah Stables Site was horse arenas, stables and training areas that was remediated by the United States Environmental Protection Agency - Region VII (EPA) during the period from August 26, 1996 to October 1, 1996. The Shenandoah property, along with the adjacent properties referenced in the Notice of Completion that were also involved in the remediation, are considered collectively to be the Shenandoah Stables Site. During these activities EPA excavated 6,451.83 tons of dioxin contaminated soil and debris and transported this material to Times Beach for thermal treatment and disposal in two hundred and seventy-eight (278) manifested shipments. Additionally, 5.78 tons (1,386 gallons) of decontamination water were delivered to the Times Beach Site by EPA contractors in one (1) manifested shipment for treatment.

Thermal treatment of this material was performed at the Times Beach Thermal Treatment Facility between September 14, 1996 and October 20, 1996 in accordance with the Consent Decree and the Missouri/EPA Hazardous Waste Management Facility Permit, as well as the terms of the other documents referenced in Section II. Following thermal treatment, treated residues were sampled and analyzed in accordance with the CERCLA Exclusion, and all treated residues achieved the Delisting Criteria in the CERCLA Exclusion. Following receipt of analytical results, the treated residues were disposed on-site at Times Beach, between September 18, 1996 and October 24, 1996. When the desired treated residue fill height was achieved a two (2) foot cover layer of non-contaminated soil was placed over the treated residue. Vegetation of the soil cover layer will be established in accordance with the requirements of the Site Restoration Work Plan.

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Section II

- Compliance References -

COMPLIANCE REFERENCES

- 1988 Times Beach/Minker Stout/Romaine Creek Record of Decision
- 1990 Explanation of Significant Differences
- 1990 Consent Decree and Final Order Between the United States of America; State of Missouri; Syntex Corporation; Syntex (U.S.A.) Inc.; Syntex Laboratories, Inc.; Syntex Agribusiness, Inc., and the following Work Plans that are incorporated by reference:

  Site Administration Workplan
  Thermal Treatment Workplan
  Site Restoration Workplan
  EPA Transportation Workplan

- 1990 CERCLA Exclusion for Times Beach Thermal Treatment Residues
- 1995 Consolidated Missouri/EPA Hazardous Waste Management Facility Permit Application
- 1996 Missouri/EPA Hazardous Waste Management Facility Permit Number MO0000335919, as modified
- 1996 St. Louis County Air Pollution Control Program Operating Permit No 5942
- 1991 Missouri NPDES Permit No. MO-0112429, as modified
- 1991 Groundwater Quality Assurance Project Plan
- 1987 Quality Assurance Project Plan for Air Monitoring, as modified

Section III

- IT Corporation Notice of Completion -

IT CORPORATION
TIMES BEACH REMEDIATION PROJECT

NOTICE OF COMPLETION
REVISION 1

SITE NO: 23

LOCATION: Shenandoah Stables

REVISION 1

In accordance with the referenced documents in Section II, IT Corporation has processed the following quantities of dioxin contaminated materials from the **SHENANDOAH STABLES** site at the Times Beach Thermal Treatment Facility:

Soil and Debris:	6,451.83 tons
Waste Water:	5.78 tons

IT Corporation has reviewed all treated material, treated waste water, and decontamination debris analytical results generated from processing waste from the SHENANDOAH STABLES site. Based on the analytical results, all waste materials received by IT Corporation from the SHENANDOAH STABLES site meet the treatment standards as defined in the Times Beach Thermal Treatment Facility Project Specifications and in accordance with the pertinent documents in Section II.

Con Murphy by

Cornelius M. Murphy
Project Manager

12/11/96
Date

William M. Stolte
QC Manager

12/11/96
Date

Section IV

- Site Closure Tracking Summary -

SITE CLOSURE TRACKING SUMMARY

As required in Part I Section VIII of the Hazardous Waste Management Facility Permit (MO0000335919) a written operating record of the Times Beach Facility has been developed and is maintained at the facility. As described in Section 5.9 of the Consolidated Missouri/EPA Hazardous Waste Management Facility Permit Application, this record supports the activities addressed in the attached "Site Closure Tracking Summary".

Contaminated materials received at the Times Beach Thermal Treatment Facility (TTF) are weighed and placed in the Feedstock Handling Building (FHB). The date and time of receipt of materials from individual sites are recorded, utilizing the unique identifier assigned each source site in the Project Data Management System (DMS). The attached "Site Closure Tracking Summary" for the Shenandoah Stables Site includes the "Delivery Date" of each shipment of contaminated materials, as well as the "Delivery Time"of each shipment. The site from where the materials originated is identified in "Waste Source". The EPA identification number is the "Waste Tracking #", and "Weight (tons)" is listed for each shipment.

Once the material was placed in the FHB, it was dried, reduced in size, and blended to facilitate optimum and proper thermal treatment. With the exception of the Bonifield material used in the Dioxin Stack Test, and material received from Bliss-Ellisville, each load of material received was combined with material already inventoried in the FHB. Because materials are combined from a number of sites, in accordance with the permit, materials are considered to have been treated on a first-in, first-out (FIFO) basis, such that the first load of material received is considered to have been the first to be processed.

Portions of the combined materials are periodically transferred into the day feed bins and analyzed to confirm that thermal treatment can be performed in compliance with permit parameters. Once such confirmation is received, the bin of feedstock is then thermally treated. Material is tracked in DMS through thermal treatment according to the "FHB Bin #" in which it was placed, the "FHB Bin Sample #", its "Process Date", and "Process Time" as shown in the attached "Site Closure Tracking Summary".

Thermally treated material was placed into one of eight holding bins in the Treated Material Handling Building (TMHB) and held there until it was analyzed against the criteria in the Times Beach CERCLA Exclusion. Once analysis confirmed that the delisting criteria had been met, the treated material was released for disposal in accordance with permit requirements. The results of the analysis of the treated materials are recorded in the "Site Closure Tracking Summary". Treated materials are described by the TMHB "Ash Bin #", and "Ash Bin Sample #". The "Disposition Code" column indicates whether the material meets the delisting criteria. The "Disposition Date" was the date when the material was released for disposal in the on-site treated material disposal cells.

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TIMES BEACH REM \TION PROJECT
SITE CLOSURE - SHENANDOAH STABLES (23)
IT CORPORATION

DELIVERY DATE	DELIVERY TIME	WASTE SOURCE	WASTE TRACKING #	FHB BIN #	FHB BIN SAMPLE #	PROCESS DATE	PROCESS TIME	ASH BIN #	ASH BIN SAMPLE #	DISPOSITION DATE	DISPOSITION CODE	WEIGHT (TONS)
8/26/96	12:44	SHENANDOAH	23001	6	F0185	9/14/96	7:12	8	A0234	9/18/96	D	20.69
8/26/96	13:51	SHENANDOAH	23002	6	F0185	9/14/96	8:59	8	A0234	9/18/96	D	18.5
8/26/96	14:03	SHENANDOAH	23003	1	F0174	9/14/96	9:31	8	A0234	9/18/96	D	19.56
8/26/96	14:38	SHENANDOAH	23004	6	F0185	9/14/96	10:09	8	A0234	9/18/96	D	18.5
8/26/96	14:55	SHENANDOAH	23005	6	F0185	9/14/96	10:42	8	A0234	9/18/96	D	19.53
8/26/96	15:16	SHENANDOAH	23006	6	F0185	9/14/96	11:14	8	A0234	9/18/96	D	20.71
8/26/96	15:45	SHENANDOAH	23007	4	F0186	9/14/96	11:56	8	A0234	9/18/96	D	19.54
8/26/96	16:59	SHENANDOAH	23008	4	F0186	9/14/96	14:47	8	A0234	9/18/96	D	18.63
8/26/96	17:23	SHENANDOAH	23009	1	F0174	9/14/96	15:25	8	A0234	9/18/96	D	17.55
8/26/96	18:38	SHENANDOAH	23010	4	F0186	9/14/96	15:55	8	A0234	9/18/96	D	19.84
8/26/96	19:12	SHENANDOAH	23011	4	F0186	9/14/96	16:33	1	A0236	9/19/96	D	20.41
8/26/96	19:56	SHENANDOAH	23012	4	F0186	9/14/96	17:56	1	A0236	9/19/96	D	19.21
8/26/96	20:28	SHENANDOAH	23013	4	F0186	9/14/96	19:09	1	A0236	9/19/96	D	21.03
8/26/96	20:49	SHENANDOAH	23014	1	F0174	9/14/96	19:54	1	A0236	9/19/96	D	17.64
8/27/96	8:33	SHENANDOAH	23015	4	F0186	9/14/96	22:37	1	A0236	9/19/96	D	23.15
8/27/96	9:08	SHENANDOAH	23016	4	F0186	9/14/96	23:22	1	A0236	9/19/96	D	22.7
8/27/96	10:36	SHENANDOAH	23017	4	F0186	9/15/96	1:42	1	A0236	9/19/96	D	16.94
8/27/96	11:18	SHENANDOAH	23018	4	F0186	9/15/96	2:11	1	A0236	9/19/96	D	25.58
8/27/96	12:19	SHENANDOAH	23019	4	F0186	9/15/96	3:33	1	A0236	9/19/96	D	22.46
8/27/96	14:00	SHENANDOAH	23020	4	F0186	9/15/96	6:04	1	A0236	9/19/96	D	21.72
8/27/96	15:16	SHENANDOAH	23021	4	F0186	9/15/96	7:48	1	A0236	9/19/96	D	22.1
8/27/96	16:02	SHENANDOAH	23022	4	F0186	9/15/96	8:25	1	A0236	9/19/96	D	23.68
8/27/96	17:08	SHENANDOAH	23023	1	F0174	9/15/96	9:19	1	A0236	9/19/96	D	21.23
8/27/96	19:24	SHENANDOAH	23024	4	F0186	9/15/96	12:27	1	A0236	9/19/96	D	20.8
8/27/96	20:36	SHENANDOAH	23025	4	F0186	9/15/96	14:10	1	A0236	9/19/96	D	21.52
8/27/96	21:06	SHENANDOAH	23026	4	F0186	9/15/96	14:45	1	A0236	9/19/96	D	22.53
8/28/96	8:50	SHENANDOAH	23027	1	F0174	9/15/96	17:52	1	A0236	9/19/96	D	24.23
8/28/96	9:31	SHENANDOAH	23028	4	F0186	9/15/96	19:11	1	A0236	9/19/96	D	23.43
8/28/96	10:09	SHENANDOAH	23029	4	F0186	9/15/96	20:26	1	A0236	9/19/96	D	24.66
8/28/96	11:42	SHENANDOAH	23030	1	F0174	9/15/96	22:26	1	A0236	9/19/96	D	24.48
8/28/96	13:12	SHENANDOAH	23031	4	F0186	9/16/96	0:15	1	A0236	9/19/96	D	23.6
8/28/96	14:06	SHENANDOAH	23032	4	F0186	9/16/96	1:36	2	A0237	9/23/96	D	27.28
8/28/96	14:50	SHENANDOAH	23033	1	F0174	9/16/96	2:54	2	A0237	9/23/96	D	23.47
8/28/96	15:20	SHENANDOAH	23034	4	F0186	9/16/96	3:33	2	A0237	9/23/96	D	25.17
8/28/96	16:59	SHENANDOAH	23035	4	F0186	9/16/96	6:25	2	A0237	9/23/96	D	25.85
8/28/96	18:06	SHENANDOAH	23037	4	F0186	9/16/96	8:19	2	A0237	9/23/96	D	22.4

8/28/96	18:53	SHENANDOAH	23036	3	F0187	9/16/96	9:46	2	A0237	9/23/96	D	26.25
8/28/96	20:01	SHENANDOAH	23038	3	F0187	9/16/96	11:22	2	A0237	9/23/96	D	22.41
8/28/96	21:26	SHENANDOAH	23039	3	F0187	9/16/96	13:33	2	A0237	9/23/96	D	22.99
8/29/96	8:23	SHENANDOAH	23040	3	F0187	9/16/96	14:24	2	A0237	9/23/96	D	22.31
8/29/96	9:00	SHENANDOAH	23041	3	F0187	9/16/96	15:04	2	A0237	9/23/96	D	23.49
8/29/96	9:28	SHENANDOAH	23042	3	F0187	9/16/96	15:45	2	A0237	9/23/96	D	22.7
8/29/96	9:49	SHENANDOAH	23043	1	F0174	9/16/96	16:23	2	A0237	9/23/96	D	16.04
8/29/96	10:33	SHENANDOAH	23044	3	F0187	9/16/96	16:55	2	A0237	9/23/96	D	23.28
8/29/96	11:00	SHENANDOAH	23045	3	F0187	9/16/96	17:34	2	A0237	9/23/96	D	22.89
8/29/96	11:12	SHENANDOAH	23047	3	F0187	9/16/96	18:19	2	A0237	9/23/96	D	24.94
8/29/96	11:27	SHENANDOAH	23046	3	F0187	9/16/96	19:08	2	A0237	9/23/96	D	16.04
8/29/96	11:52	SHENANDOAH	23048	3	F0187	9/16/96	19:36	2	A0237	9/23/96	D	16.44
8/29/96	12:16	SHENANDOAH	23049	1	F0174	9/16/96	20:07	2	A0237	9/23/96	D	23.44
8/29/96	12:41	SHENANDOAH	23050	3	F0187	9/16/96	20:50	2	A0237	9/23/96	D	27.85
8/29/96	13:30	SHENANDOAH	23051	3	F0187	9/16/96	21:49	2	A0237	9/23/96	D	24.45
8/29/96	13:53	SHENANDOAH	23052	3	F0187	9/16/96	22:32	2	A0237	9/23/96	D	15.86
8/29/96	14:26	SHENANDOAH	23053	3	F0187	9/16/96	23:00	2	A0237	9/23/96	D	27.76
8/29/96	14:47	SHENANDOAH	23054	3	F0187	9/16/96	23:54	2	A0237	9/23/96	D	22.66
8/29/96	15:10	SHENANDOAH	23055	1	F0174	9/17/96	0:34	2	A0237	9/23/96	D	19.99
8/29/96	15:30	SHENANDOAH	23056	3	F0187	9/17/96	1:08	2	A0237	9/23/96	D	26.39
8/29/96	16:00	SHENANDOAH	23057	3	F0187	9/17/96	1:52	2	A0237	9/23/96	D	21.09
8/29/96	16:34	SHENANDOAH	23058	3	F0187	9/17/96	2:28	2	A0237	9/23/96	D	24.35
8/29/96	17:05	SHENANDOAH	23059	3	F0187	9/17/96	3:13	2	A0237	9/23/96	D	27.27
8/29/96	18:20	SHENANDOAH	23060	3	F0187	9/17/96	3:59	2	A0237	9/23/96	D	26.22
8/29/96	18:52	SHENANDOAH	23061	1	F0174	9/17/96	4:45	2	A0237	9/23/96	D	28.44
8/29/96	19:29	SHENANDOAH	23062	3	F0187	9/17/96	5:36	2	A0237	9/23/96	D	16.98
8/29/96	20:03	SHENANDOAH	23063	3	F0187	9/17/96	6:05	2	A0237	9/23/96	D	26.18
8/29/96	20:32	SHENANDOAH	23064	3	F0187	9/17/96	6:50	2	A0237	9/23/96	D	23.76
8/30/96	6:26	SHENANDOAH	23065	3	F0187	9/17/96	7:29	2	A0237	9/23/96	D	17.87
8/30/96	8:22	SHENANDOAH	23066	3	F0187	9/17/96	8:03	2	A0237	9/23/96	D	25.31
8/30/96	8:48	SHENANDOAH	23067	1	F0174	9/17/96	8:48	5	A0238	9/23/96	D	20.11
8/30/96	9:20	SHENANDOAH	23068	3	F0187	9/17/96	9:22	5	A0238	9/23/96	D	20.88
8/30/96	9:36	SHENANDOAH	23069	3	F0187	9/17/96	9:58	5	A0238	9/23/96	D	18.5
8/30/96	9:59	SHENANDOAH	23070	3	F0187	9/17/96	10:32	5	A0238	9/23/96	D	22.3
8/30/96	10:18	SHENANDOAH	23071	3	F0187	9/17/96	11:10	5	A0238	9/23/96	D	19.02
8/30/96	10:25	SHENANDOAH	23072	3	F0187	9/17/96	11:52	5	A0238	9/23/96	D	18.12
8/30/96	10:44	SHENANDOAH	23073	1	F0174	9/17/96	12:22	5	A0238	9/23/96	D	20.76
8/30/96	11:10	SHENANDOAH	23074	3	F0187	9/17/96	12:58	5	A0238	9/23/96	D	21.15
8/30/96	12:33	SHENANDOAH	23075	3	F0187	9/17/96	13:41	5	A0238	9/23/96	D	22.35

8/30/96	13:06	SHENANDOAH	23076	3	F0187	9/17/96	14:23	5	A0238	9/23/96	D	23.7
8/30/96	13:53	SHENANDOAH	23077	3	F0187	9/17/96	18:02	5	A0238	9/23/96	D	19.01
8/30/96	14:27	SHENANDOAH	23078	3	F0187	9/17/96	18:34	5	A0238	9/23/96	D	24.88
8/30/96	15:00	SHENANDOAH	23080	1	F0174	9/17/96	19:17	5	A0238	9/23/96	D	21
8/30/96	15:20	SHENANDOAH	23079	3	F0187	9/17/96	19:56	5	A0238	9/23/96	D	18.78
8/30/96	15:49	SHENANDOAH	23081	3	F0187	9/17/96	20:34	5	A0238	9/23/96	D	24.27
8/30/96	16:15	SHENANDOAH	23082	3	F0187	9/17/96	21:26	5	A0238	9/23/96	D	25.23
9/3/96	8:25	SHENANDOAH	23083	3	F0187	9/17/96	22:11	5	A0238	9/23/96	D	18.52
9/3/96	8:47	SHENANDOAH	23084	6	F0188	9/17/96	23:02	5	A0238	9/23/96	D	20.76
9/3/96	9:11	SHENANDOAH	23085	6	F0188	9/17/96	23:40	5	A0238	9/23/96	D	19
9/3/96	9:30	SHENANDOAH	23086	6	F0188	9/18/96	0:11	5	A0238	9/23/96	D	19.3
9/3/96	9:58	SHENANDOAH	23087	6	F0188	9/18/96	0:43	5	A0238	9/23/96	D	19.94
9/3/96	10:21	SHENANDOAH	23088	6	F0188	9/18/96	1:19	5	A0238	9/23/96	D	26.39
9/3/96	10:46	SHENANDOAH	23090	6	F0188	9/18/96	2:04	5	A0238	9/23/96	D	26.46
9/3/96	11:22	SHENANDOAH	23091	6	F0188	9/18/96	2:48	5	A0238	9/23/96	D	26.68
9/3/96	11:52	SHENANDOAH	23092	6	F0188	9/18/96	3:33	5	A0238	9/23/96	D	19.03
9/3/96	12:39	SHENANDOAH	23093	6	F0188	9/18/96	4:07	5	A0238	9/23/96	D	24.09
9/3/96	13:00	SHENANDOAH	23094	6	F0188	9/18/96	4:50	5	A0238	9/23/96	D	18.73
9/3/96	13:25	SHENANDOAH	23089	6	F0188	9/18/96	5:24	5	A0238	9/23/96	D	24.32
9/3/96	13:41	SHENANDOAH	23095	6	F0188	9/18/96	14:27	5	A0238	9/23/96	D	18.87
9/3/96	14:04	SHENANDOAH	23096	6	F0188	9/18/96	14:58	5	A0238	9/23/96	D	24.31
9/3/96	14:32	SHENANDOAH	23097	6	F0188	9/18/96	17:12	5	A0238	9/23/96	D	24.63
9/3/96	15:09	SHENANDOAH	23098	6	F0188	9/18/96	18:03	5	A0238	9/23/96	D	24.46
9/3/96	15:49	SHENANDOAH	23099	6	F0188	9/18/96	19:01	5	A0238	9/23/96	D	26.5
9/3/96	16:13	SHENANDOAH	23100	6	F0188	9/18/96	20:03	5	A0238	9/23/96	D	13.11
9/3/96	16:39	SHENANDOAH	23101	6	F0188	9/18/96	20:32	5	A0238	9/23/96	D	23.37
9/3/96	17:20	SHENANDOAH	23102	6	F0188	9/18/96	21:26	5	A0238	9/23/96	D	17.1
9/3/96	17:40	SHENANDOAH	23103	6	F0188	9/18/96	22:04	5	A0238	9/23/96	D	25.48
9/3/96	18:23	SHENANDOAH	23104	6	F0188	9/18/96	23:04	5	A0238	9/23/96	D	18.65
9/3/96	19:29	SHENANDOAH	23105	6	F0188	9/18/96	23:44	5	A0238	9/23/96	D	23.46
9/3/96	19:56	SHENANDOAH	23106	6	F0188	9/19/96	0:37	5	A0238	9/23/96	D	27.43
9/3/96	20:26	SHENANDOAH	23107	6	F0188	9/19/96	1:39	5	A0238	9/23/96	D	27.13
9/3/96	21:05	SHENANDOAH	23108	6	F0188	9/19/96	2:44	5	A0238	9/23/96	D	27.39
9/4/96	8:15	SHENANDOAH	23110	6	F0188	9/19/96	3:49	5	A0238	9/23/96	D	29.83
9/4/96	8:35	SHENANDOAH	23109	6	F0188	9/19/96	4:55	6	A0239	9/24/96	D	22.58
9/4/96	8:58	SHENANDOAH	23111	6	F0188	9/19/96	5:44	6	A0239	9/24/96	D	21.73
9/4/96	9:17	SHENANDOAH	23112	6	F0188	9/19/96	6:38	6	A0239	9/24/96	D	25.98
9/4/96	9:41	SHENANDOAH	23113	6	F0188	9/19/96	7:38	6	A0239	9/24/96	D	19.51
9/4/96	9:59	SHENANDOAH	23114	6	F0188	9/19/96	8:20	6	A0239	9/24/96	D	26.47

TIMES BEACH REME TION PROJECT
SITE CLOSURE - SHENANDOAH STABLES (23)
IT CORPORATION

9/4/96	10:22	SHENANDOAH	23115	6	F0188	9/19/96	9:28	6	A0239	9/24/96	D	24.04
9/4/96	10:38	SHENANDOAH	23116	6	F0188	9/19/96	11:45	6	A0239	9/24/96	D	23
9/4/96	11:02	SHENANDOAH	23117	6	F0188	9/19/96	12:39	6	A0239	9/24/96	D	21.08
9/4/96	11:40	SHENANDOAH	23118	6	F0188	9/19/96	13:26	6	A0239	9/24/96	D	21.31
9/4/96	12:31	SHENANDOAH	23119	6	F0188	9/19/96	14:13	6	A0239	9/24/96	D	21.96
9/4/96	13:38	SHENANDOAH	23121	6	F0188	9/19/96	15:07	6	A0239	9/24/96	D	25.39
9/4/96	13:59	SHENANDOAH	23120	6	F0188	9/19/96	16:21	6	A0239	9/24/96	D	25.19
9/4/96	14:51	SHENANDOAH	23122	6	F0188	9/19/96	17:17	6	A0239	9/24/96	D	22.65
9/4/96	15:12	SHENANDOAH	23123	6	F0188	9/19/96	18:08	6	A0239	9/24/96	D	22.61
9/4/96	15:54	SHENANDOAH	23124	6	F0188	9/19/96	18:59	6	A0239	9/24/96	D	23.27
9/4/96	16:33	SHENANDOAH	23125	4	F0189	9/19/96	20:18	6	A0239	9/24/96	D	24.02
9/4/96	18:03	SHENANDOAH	23126	4	F0189	9/19/96	21:52	6	A0239	9/24/96	D	22
9/4/96	18:27	SHENANDOAH	23127	4	F0189	9/19/96	22:43	6	A0239	9/24/96	D	21.71
9/4/96	19:07	SHENANDOAH	23128	4	F0189	9/20/96	0:16	6	A0239	9/24/96	D	22.21
9/4/96	19:38	SHENANDOAH	23129	1	F0174	9/20/96	1:04	6	A0239	9/24/96	D	25.06
9/4/96	20:21	SHENANDOAH	23130	4	F0189	9/20/96	2:46	6	A0239	9/24/96	D	25.05
9/4/96	21:00	SHENANDOAH	23131	4	F0189	9/20/96	4:37	6	A0239	9/24/96	D	24.49
9/5/96	7:20	SHENANDOAH	23132	4	F0189	9/20/96	5:31	6	A0239	9/24/96	D	24.33
9/5/96	7:35	SHENANDOAH	23133	4	F0189	9/20/96	6:25	6	A0239	9/24/96	D	20.55
9/5/96	8:09	SHENANDOAH	23134	4	F0189	9/20/96	7:10	6	A0239	9/24/96	D	24.92
9/5/96	8:34	SHENANDOAH	23135	1	F0174	9/20/96	8:07	6	A0239	9/24/96	D	24.97
9/5/96	9:15	SHENANDOAH	23136	4	F0189	9/20/96	9:46	6	A0239	9/24/96	D	23.78
9/5/96	9:57	SHENANDOAH	23137	4	F0189	9/20/96	11:24	6	A0239	9/24/96	D	25.07
9/5/96	10:28	SHENANDOAH	23138	4	F0189	9/20/96	12:20	6	A0239	9/24/96	D	23.49
9/5/96	11:15	SHENANDOAH	23139	4	F0189	9/20/96	14:01	6	A0239	9/24/96	D	23.35
9/5/96	11:38	SHENANDOAH	23140	1	F0174	9/20/96	14:54	6	A0239	9/24/96	D	25.19
9/5/96	12:09	SHENANDOAH	23141	4	F0189	9/20/96	15:55	1	A0240	9/25/96	D	25.04
9/5/96	13:38	SHENANDOAH	23142	4	F0189	9/20/96	17:57	1	A0240	9/25/96	D	26.34
9/5/96	14:44	SHENANDOAH	23143	4	F0189	9/20/96	19:43	1	A0240	9/25/96	D	23.65
9/5/96	15:06	SHENANDOAH	23144	4	F0189	9/20/96	20:38	1	A0240	9/25/96	D	23.78
9/5/96	15:27	SHENANDOAH	23145	4	F0189	9/20/96	21:37	1	A0240	9/25/96	D	23.74
9/5/96	16:05	SHENANDOAH	23146	4	F0189	9/20/96	23:19	1	A0240	9/25/96	D	23.92
9/5/96	16:38	SHENANDOAH	23147	4	F0189	9/21/96	0:34	1	A0240	9/25/96	D	24.65
9/5/96	18:00	SHENANDOAH	23148	4	F0189	9/21/96	2:28	1	A0240	9/25/96	D	24.74
9/5/96	18:45	SHENANDOAH	23149	4	F0189	9/21/96	9:22	1	A0240	9/25/96	D	23.62
9/5/96	19:46	SHENANDOAH	23150	3	F0192	9/21/96	11:10	1	A0240	9/25/96	D	21.88
9/5/96	20:19	SHENANDOAH	23151	3	F0192	9/21/96	11:59	1	A0240	9/25/96	D	26.56
9/5/96	20:55	SHENANDOAH	23152	3	F0192	9/21/96	12:56	1	A0240	9/25/96	D	25.6
9/5/96	21:54	SHENANDOAH	23153	3	F0192	9/21/96	14:48	1	A0240	9/25/96	D	25.36

9/6/96	7:32	SHENANDOAH	23154	3	F0192	9/21/96	16:32	1	A0240	9/25/96	D	27.85
9/6/96	8:17	SHENANDOAH	23155	3	F0192	9/21/96	18:15	1	A0240	9/25/96	D	25.83
9/6/96	8:34	SHENANDOAH	23156	3	F0192	9/21/96	19:16	1	A0240	9/25/96	D	28.31
9/6/96	9:10	SHENANDOAH	23157	3	F0192	9/21/96	21:04	3	A0241	9/26/96	D	24.03
9/6/96	10:12	SHENANDOAH	23158	3	F0192	9/21/96	22:50	3	A0241	9/26/96	D	24.54
9/6/96	10:35	SHENANDOAH	23159	3	F0192	9/21/96	23:45	3	A0241	9/26/96	D	24.25
9/6/96	10:57	SHENANDOAH	23160	3	F0192	9/22/96	1:38	3	A0241	9/26/96	D	25.21
9/6/96	11:09	SHENANDOAH	23161	3	F0192	9/22/96	3:27	3	A0241	9/26/96	D	25.26
9/6/96	11:37	SHENANDOAH	23162	3	F0192	9/22/96	4:25	3	A0241	9/26/96	D	24.37
9/6/96	12:00	SHENANDOAH	23163	3	F0192	9/22/96	6:22	3	A0241	9/26/96	D	26.99
9/6/96	12:39	SHENANDOAH	23164	3	F0192	9/22/96	7:30	3	A0241	9/26/96	D	24.5
9/6/96	13:16	SHENANDOAH	23165	3	F0192	9/22/96	9:40	3	A0241	9/26/96	D	25.62
9/6/96	14:00	SHENANDOAH	23166	5	F0190	9/22/96	11:26	3	A0241	9/26/96	D	23.06
9/6/96	14:23	SHENANDOAH	23167	5	F0190	9/22/96	13:45	3	A0241	9/26/96	D	22.02
9/6/96	14:37	SHENANDOAH	23168	3	F0192	9/22/96	14:57	3	A0241	9/26/96	D	22.8
9/6/96	15:13	SHENANDOAH	23169	3	F0192	9/22/96	16:41	3	A0241	9/26/96	D	24.06
9/6/96	15:33	SHENANDOAH	23170	3	F0192	9/22/96	18:27	3	A0241	9/26/96	D	26.66
9/6/96	15:47	SHENANDOAH	23171	3	F0192	9/22/96	19:29	3	A0241	9/26/96	D	26.16
9/6/96	16:36	SHENANDOAH	23172	3	F0192	9/22/96	21:29	3	A0241	9/26/96	D	26.15
9/6/96	17:41	SHENANDOAH	23173	3	F0192	9/22/96	23:19	3	A0241	9/26/96	D	25.67
9/6/96	18:38	SHENANDOAH	23174	5	F0190	9/23/96	2:32	3	A0241	9/26/96	D	26.41
9/6/96	19:10	SHENANDOAH	23175	5	F0190	9/23/96	3:44	8	A0242	9/30/96	D	25.95
9/6/96	19:55	SHENANDOAH	23176	5	F0190	9/23/96	5:57	4	A0243	9/27/96	D	24.95
9/6/96	20:38	SHENANDOAH	23177	5	F0190	9/23/96	8:00	4	A0243	9/27/96	D	23.98
9/7/96	7:36	SHENANDOAH	23178	5	F0190	9/24/96	3:24	8	A0242	9/30/96	D	26.6
9/7/96	8:23	SHENANDOAH	23179	5	F0190	9/24/96	6:04	8	A0242	9/30/96	D	26.24
9/7/96	8:39	SHENANDOAH	23180	5	F0190	9/24/96	7:04	8	A0242	9/30/96	D	23.72
9/7/96	9:03	SHENANDOAH	23181	5	F0190	9/24/96	9:05	8	A0242	9/30/96	D	24.01
9/7/96	9:41	SHENANDOAH	23182	5	F0190	9/24/96	10:04	8	A0242	9/30/96	D	23.14
9/7/96	10:16	SHENANDOAH	23183	5	F0190	9/24/96	11:40	8	A0242	9/30/96	D	24.02
9/7/96	11:07	SHENANDOAH	23184	5	F0190	9/24/96	13:30	8	A0242	9/30/96	D	23.93
9/7/96	11:35	SHENANDOAH	23185	5	F0190	9/24/96	15:34	8	A0242	9/30/96	D	24.35
9/7/96	11:47	SHENANDOAH	23186	5	F0190	9/24/96	16:35	8	A0242	9/30/96	D	22.98
9/7/96	12:25	SHENANDOAH	23187	5	F0190	9/24/96	18:11	8	A0242	9/30/96	D	25.38
9/7/96	12:45	SHENANDOAH	23188	5	F0190	9/24/96	19:04	8	A0242	9/30/96	D	26.74
9/7/96	13:33	SHENANDOAH	23189	5	F0190	9/24/96	20:54	8	A0242	9/30/96	D	26.48
9/7/96	13:56	SHENANDOAH	23190	5	F0190	9/24/96	22:14	8	A0242	9/30/96	D	25.67
9/9/96	11:46	SHENANDOAH	23191	5	F0190	9/25/96	5:34	2	A0244	9/30/96	D	18.77
9/9/96	13:15	SHENANDOAH	23192	1	F0194	9/25/96	6:44	2	A0244	9/30/96	D	21.13

TIMES BEACH REMEDIATION PROJECT
SITE CLOSURE - SHENANDOAH STABLES (23)
IT CORPORATION

9/9/96	13:42	SHENANDOAH	23193	1	F0194	9/25/96	8:19	2	A0244	9/30/96	D	23.25
9/9/96	14:16	SHENANDOAH	23194	1	F0194	9/25/96	9:56	2	A0244	9/30/96	D	18.9
9/9/96	14:49	SHENANDOAH	23195	1	F0194	9/25/96	11:27	2	A0244	9/30/96	D	22.05
9/9/96	15:27	SHENANDOAH	23196	1	F0194	9/25/96	13:00	2	A0244	9/30/96	D	18.04
9/9/96	15:46	SHENANDOAH	23197	6	F0193	9/25/96	13:32	2	A0244	9/30/96	D	19.69
9/9/96	16:16	SHENANDOAH	23198	6	F0193	9/25/96	15:09	2	A0244	9/30/96	D	19.4
9/9/96	16:38	SHENANDOAH	23199	6	F0193	9/25/96	16:41	2	A0244	9/30/96	D	19.23
9/9/96	17:46	SHENANDOAH	23200	1	F0194	9/25/96	19:04	2	A0244	9/30/96	D	22.35
9/9/96	17:59	SHENANDOAH	23201	6	F0193	9/25/96	20:01	2	A0244	9/30/96	D	22.29
9/9/96	18:34	SHENANDOAH	23202	6	F0193	9/25/96	21:35	2	A0244	9/30/96	D	24.26
9/9/96	19:07	SHENANDOAH	23203	6	F0193	9/25/96	23:51	2	A0244	9/30/96	D	24.96
9/9/96	20:10	SHENANDOAH	23204	1	F0194	9/26/96	2:28	2	A0244	9/30/96	D	25.26
9/9/96	21:05	SHENANDOAH	23205	1	F0194	9/26/96	4:09	2	A0244	9/30/96	D	22.87
9/9/96	21:23	SHENANDOAH	23206	6	F0193	9/26/96	5:00	2	A0244	9/30/96	D	22.24
9/9/96	21:40	SHENANDOAH	23207	1	F0194	9/26/96	5:49	2	A0244	9/30/96	D	21.89
9/9/96	21:55	SHENANDOAH	23208	6	F0193	9/26/96	6:39	5	A0245	10/1/96	D	24.27
9/10/96	7:30	SHENANDOAH	23209	6	F0193	9/26/96	8:13	5	A0245	10/1/96	D	22.87
9/10/96	8:05	SHENANDOAH	23210	6	F0193	9/26/96	12:30	5	A0245	10/1/96	D	24.45
9/10/96	8:35	SHENANDOAH	23211	6	F0193	9/26/96	14:11	5	A0245	10/1/96	D	27.96
9/10/96	9:08	SHENANDOAH	23212	6	F0193	9/26/96	15:54	5	A0245	10/1/96	D	25.62
9/10/96	9:34	SHENANDOAH	23213	6	F0193	9/26/96	17:31	5	A0245	10/1/96	D	24.44
9/10/96	10:44	SHENANDOAH	23214	6	F0193	9/26/96	19:02	5	A0245	10/1/96	D	25.86
9/10/96	10:59	SHENANDOAH	23215	1	F0194	9/26/96	20:01	5	A0245	10/1/96	D	27.24
9/10/96	11:17	SHENANDOAH	23216	6	F0193	9/26/96	20:59	5	A0245	10/1/96	D	26.51
9/10/96	11:46	SHENANDOAH	23217	6	F0193	9/26/96	22:42	5	A0245	10/1/96	D	21.66
9/10/96	12:29	SHENANDOAH	23218	6	F0193	9/27/96	0:20	5	A0245	10/1/96	D	21.38
9/10/96	13:01	SHENANDOAH	23219	6	F0193	9/27/96	1:55	5	A0245	10/1/96	D	22.59
9/10/96	13:15	SHENANDOAH	23220	1	F0194	9/27/96	4:05	5	A0245	10/1/96	D	22.04
9/10/96	14:26	SHENANDOAH	23222	6	F0193	9/27/96	6:17	5	A0245	10/1/96	D	22.06
9/10/96	14:46	SHENANDOAH	23221	1	F0194	9/27/96	7:06	5	A0245	10/1/96	D	22.12
9/10/96	15:40	SHENANDOAH	23224	6	F0193	9/27/96	9:20	5	A0245	10/1/96	D	24.7
9/10/96	16:26	SHENANDOAH	23225	6	F0193	9/27/96	10:34	5	A0245	10/1/96	D	23.11
9/10/96	16:36	SHENANDOAH	23223	1	F0194	9/27/96	11:15	5	A0245	10/1/96	D	23.94
9/10/96	16:47	SHENANDOAH	23226	6	F0193	9/27/96	12:01	1	A0246	10/1/96	D	22.36
9/10/96	17:30	SHENANDOAH	23227	6	F0193	9/27/96	13:28	1	A0246	10/1/96	D	24.16
9/10/96	17:47	SHENANDOAH	23228	1	F0194	9/27/96	14:10	1	A0246	10/1/96	D	23.34
9/10/96	18:01	SHENANDOAH	23229	6	F0193	9/27/96	14:55	1	A0246	10/1/96	D	22.56
9/10/96	19:35	SHENANDOAH	23230	1	F0194	9/27/96	18:05	1	A0246	10/1/96	D	24.21
9/10/96	20:11	SHENANDOAH	23231	1	F0194	9/27/96	19:49	1	A0246	10/1/96	D	24.04

9/10/96	20:50	SHENANDOAH	23232	1	F0194	9/27/96	21:33	1	A0246	10/1/96	D	23.08
9/10/96	20:57	SHENANDOAH	23233	6	F0193	9/27/96	22:22	1	A0246	10/1/96	D	24.11
9/11/96	7:22	SHENANDOAH	23234	1	F0194	9/28/96	0:26	1	A0246	10/1/96	D	21.74
9/11/96	8:20	SHENANDOAH	23236	4	F0191	9/28/96	2:47	1	A0246	10/1/96	D	23.18
9/11/96	8:56	SHENANDOAH	23237	4	F0191	9/28/96	4:09	1	A0246	10/1/96	D	21.88
9/11/96	9:32	SHENANDOAH	23238	4	F0191	9/28/96	5:38	1	A0246	10/1/96	D	22.21
9/11/96	9:50	SHENANDOAH	23239	4	F0191	9/28/96	6:18	1	A0246	10/1/96	D	22.62
9/11/96	10:44	SHENANDOAH	23240	4	F0191	9/28/96	8:25	1	A0246	10/1/96	D	21.33
9/11/96	11:00	SHENANDOAH	23241	4	F0191	9/28/96	9:11	1	A0246	10/1/96	D	19.01
9/11/96	11:53	SHENANDOAH	23242	4	F0191	9/28/96	11:01	1	A0246	10/1/96	D	20.9
9/11/96	13:02	SHENANDOAH	23235	4	F0191	9/28/96	11:37	1	A0246	10/1/96	D	23.53
9/11/96	13:19	SHENANDOAH	23243	4	F0191	9/28/96	12:19	4	A0247	10/3/96	D	21.54
9/11/96	13:54	SHENANDOAH	23244	4	F0191	9/28/96	13:34	4	A0247	10/3/96	D	21.49
9/11/96	14:22	SHENANDOAH	23245	4	F0191	9/28/96	14:44	4	A0247	10/3/96	D	25.95
9/11/96	14:49	SHENANDOAH	23246	4	F0191	9/28/96	16:04	4	A0247	10/3/96	D	21.44
9/11/96	16:13	SHENANDOAH	23247	4	F0191	9/28/96	20:47	4	A0247	10/3/96	D	23.34
9/11/96	16:29	SHENANDOAH	23248	4	F0191	9/28/96	21:37	4	A0247	10/3/96	D	23.81
9/11/96	17:00	SHENANDOAH	23249	4	F0191	9/28/96	23:18	4	A0247	10/3/96	D	25.33
9/11/96	18:11	SHENANDOAH	23250	4	F0191	9/29/96	1:48	4	A0247	10/3/96	D	27.61
9/11/96	18:30	SHENANDOAH	23251	4	F0191	9/29/96	2:45	4	A0247	10/3/96	D	28.62
9/11/96	19:22	SHENANDOAH	23252	4	F0191	9/29/96	4:27	4	A0247	10/3/96	D	27.22
9/11/96	20:15	SHENANDOAH	23254	4	F0191	9/29/96	6:08	4	A0247	10/3/96	D	29.41
9/11/96	20:42	SHENANDOAH	23253	4	F0191	9/29/96	7:06	4	A0247	10/3/96	D	28.84
9/11/96	21:55	SHENANDOAH	23255	4	F0191	9/29/96	9:33	4	A0247	10/3/96	D	28.13
9/12/96	7:19	SHENANDOAH	23256	5	F0196	9/29/96	15:13	4	A0247	10/3/96	D	25.47
9/12/96	7:46	SHENANDOAH	23257	5	F0196	9/29/96	16:58	4	A0247	10/3/96	D	28.34
9/12/96	8:18	SHENANDOAH	23258	5	F0196	9/29/96	18:43	4	A0247	10/3/96	D	26.28
9/12/96	8:58	SHENANDOAH	23259	5	F0196	9/29/96	21:29	4	A0247	10/3/96	D	22.28
9/12/96	9:51	SHENANDOAH	23260	5	F0196	9/30/96	0:05	6	A0248	10/4/96	D	26.31
9/12/96	10:45	SHENANDOAH	23261	5	F0196	9/30/96	1:49	6	A0248	10/4/96	D	28.13
9/12/96	11:21	SHENANDOAH	23262	5	F0196	9/30/96	4:27	6	A0248	10/4/96	D	24.62
9/12/96	11:34	SHENANDOAH	23263	5	F0196	9/30/96	5:37	6	A0248	10/4/96	D	23.1
9/12/96	12:10	SHENANDOAH	23264	5	F0196	9/30/96	7:05	6	A0248	10/4/96	D	25.5
9/12/96	12:37	SHENANDOAH	23265	5	F0196	9/30/96	8:43	6	A0248	10/4/96	D	25.53
9/12/96	13:53	SHENANDOAH	23266	5	F0196	9/30/96	11:42	6	A0248	10/4/96	D	23.49
9/12/96	14:16	SHENANDOAH	23267	5	F0196	9/30/96	12:35	6	A0248	10/4/96	D	23.85
9/12/96	14:58	SHENANDOAH	23268	5	F0196	9/30/96	15:37	6	A0248	10/4/96	D	21.74
9/12/96	15:23	SHENANDOAH	23269	5	F0196	9/30/96	17:16	6	A0248	10/4/96	D	21.67
9/12/96	15:52	SHENANDOAH	23270	5	F0196	9/30/96	18:07	6	A0248	10/4/96	D	24

TIMES BEACH REMI .TION PROJECT
SITE CLOSURE - SHENANDOAH STABLES (23)
IT CORPORATION

9/12/96	16:14	SHENANDOAH	23271	5	F0196	9/30/96	20:12	6	A0248	10/4/96	D	25.08
9/12/96	17:49	SHENANDOAH	23272	5	F0196	9/30/96	23:47	6	A0248	10/4/96	D	23.68
9/12/96	18:50	SHENANDOAH	23273	3	F0195	10/1/96	2:27	3	A0249	10/7/96	D	26.42
9/12/96	19:10	SHENANDOAH	23274	3	F0195	10/1/96	3:28	3	A0249	10/7/96	D	23.9
9/12/96	19:31	SHENANDOAH	23275	3	F0195	10/1/96	4:20	3	A0249	10/7/96	D	24.17
9/12/96	20:17	SHENANDOAH	23276	3	F0195	10/1/96	5:58	3	A0249	10/7/96	D	13.37
9/17/96	15:20	SHENANDOAH	23277	6	F0199	10/6/96	9:46	8	A0254	10/10/96	D	27.52
10/1/96	6:28	SHENANDOAH	23279	1	F0211	10/20/96	14:12	2	A0263	10/24/96	D	6.29
											TOTAL WASTE PROCESSED =	6,451.83

TIMES BEACH REMEDIATION PROJECT

SHENANDOAH STABLES HAZARDOUS WASTE LIQUID SHIPMENTS

DATE	TIME	MANIFEST #	WEIGHT/LBS
09/21/96	09:46	23-0278	11,560
		TOTAL	11,560 = 1,386 GAL.

Section V

- Summary of Delisting Analytics -

Times Beach Remediation Project
Summary of Pass/Fail Delisting Treatment Residues
Shenandoah Stables (Site No. 23)

	Limits	A0234	A0236	A0237	A0238	A0239	A0240	A0241	A0242	A0243	A0244
Metals	Date	19-Sep-96	19-Sep-96	23-Sep-96	23-Sep-96	24-Sep-96	25-Sep-96	26-Sep-96	30-Sep-96	27-Sep-96	30-Sep-96
Chromium (Cr)	5.0 mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead (Pb)	5.0 mg/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organics											
2,3,4-Trichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,5-Dichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,4-Dichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,5-Tetrachlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,5-Tetrachlorobenzene	100 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorophene	200 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	50 ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCDD											
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.0 ppb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Times Beach Remediation Project
Summary of Pass/Fail Delisting Treatment Residues
Shenandoah Stables (Site No. 23)

	Limits	A0245	A0246	A0247	A0248	A0249	A0254	A0263
Metals	**Date**	01-Oct-96	01-Oct-96	03-Oct-96	04-Oct-96	07-Oct-96	10-Oct-96	24-Oct-96
Chromium (Cr)	5.0 mg/l	NA	NA	NA	NA	NA	NA	NA
Lead (Pb)	5.0 mg/l	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organics								
2,3,4-Trichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND
2,5-Dichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND
3,4-Dichlorophenol	100 ppm	ND	ND	ND	ND	ND	ND	ND
2,3,4,5-Tetrachlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND
2,3,4,6-Tetrachlorophenol	10 ppm	ND	ND	ND	ND	ND	ND	ND
1,2,4,5-Tetrachlorobenzene	100 ppm	ND	ND	ND	ND	ND	ND	ND
1,2,3,5-Tetrachlorobenzene	100 ppm	ND	ND	ND	ND	ND	ND	ND
Hexachlorophene	200 ppm	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	50 ppm	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	50 ppm	ND	ND	ND	ND	ND	ND	ND
Chrysene	50 ppm	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	50 ppm	ND	ND	ND	ND	ND	ND	ND
Ideno(1,2,3-c,d)pyrene	50 ppm	ND	ND	ND	ND	ND	ND	ND
Benzo(b)flouranthene	50 ppm	ND	ND	ND	ND	ND	ND	ND
TCDD								
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.0 ppb	ND	ND	ND	ND	ND	ND	ND

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Section VI

- Quality Assurance Review -

QUALITY ASSURANCE REVIEW

As required in Part I Section VIII of the Hazardous Waste Management Facility Permit (MO0000335919) a written operating record of the Times Beach Facility has been developed and is maintained at the facility. A Quality Assurance review of the Shenandoah Stables Site has been completed verifying the accuracy and correct completion of all documentation and is incorporated into the operating record.

Section VII

- Manifest to Scale Ticket Cross Reference -

MANIFEST TO SCALE TICKET CROSS REFERENCE

As required in Part I Section VIII of the Hazardous Waste Management Facility Permit (MO0000335919) a written operating record of the Times Beach Facility has been developed and is maintained at the facility. This record includes copies of the EPA Manifests and the Times Beach generated Scale Tickets as listed in the attached summary.

Eastern Missouri Dioxin Sites
Times Beach Remediation Project
Manifest/Scale Ticket Index

Shenandoah Stables (Site No. 23)

Manifest No.	Scale Ticket No
23- 0 0 0 1	7443
23- 0 0 0 2	7446
23- 0 0 0 3	7447
23- 0 0 0 4	7450
23- 0 0 0 5	7451
23- 0 0 0 6	7452
23- 0 0 0 7	7453
23- 0 0 0 8	7457
23- 0 0 0 9	7458
23- 0 0 1 0	7460
23- 0 0 1 1	7461
23- 0 0 1 2	7463
23- 0 0 1 3	7465
23- 0 0 1 4	7466
23- 0 0 1 5	7471
23- 0 0 1 6	7472
23- 0 0 1 7	7476
23- 0 0 1 8	7477
23- 0 0 1 9	7479
23- 0 0 2 0	7483
23- 0 0 2 1	7487
23- 0 0 2 2	7488
23- 0 0 2 3	7489
23- 0 0 2 4	7494
23- 0 0 2 5	7497
23- 0 0 2 6	7498
23- 0 0 2 7	7504
23- 0 0 2 8	7507
23- 0 0 2 9	7509
23- 0 0 3 0	7512
23- 0 0 3 1	7515
23- 0 0 3 2	7518
23- 0 0 3 3	7520
23- 0 0 3 4	7521
23- 0 0 3 5	7525
23- 0 0 3 6	7530
23- 0 0 3 7	7528
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23- 0 0 4 2	7540
23- 0 0 4 3	7541
23- 0 0 4 4	7542
23- 0 0 4 5	7543
23- 0 0 4 6	7545
23- 0 0 4 7	7544
23- 0 0 4 8	7546
23- 0 0 4 9	7547
23- 0 0 5 0	7548
23- 0 0 5 1	7551
23- 0 0 5 2	7553
23- 0 0 5 3	7554
23- 0 0 5 4	7555
23- 0 0 5 5	7556
23- 0 0 5 6	7557
23- 0 0 5 7	7558
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23- 0 0 5 9	7560
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23- 0 0 6 5	7566
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23- 0 1 9 7	7772
23- 0 1 9 8	7774
23- 0 1 9 9	7776
23- 0 2 0 0	7779

Eastern Missouri Dioxin Sites
Times Beach Remediation Project
Manifest/Scale Ticket Index

Shenandoah Stables (Site No. 23)

Manifest No.	Scale Ticket No
23- 0 2 0 1	7780
23- 0 2 0 2	7782
23- 0 2 0 3	7784
23- 0 2 0 4	7787
23- 0 2 0 5	7789
23- 0 2 0 6	7790
23- 0 2 0 7	7791
23- 0 2 0 8	7792
23- 0 2 0 9	7794
23- 0 2 1 0	7796
23- 0 2 1 1	7799
23- 0 2 1 2	7802
23- 0 2 1 3	7804
23- 0 2 1 4	7806
23- 0 2 1 5	7807
23- 0 2 1 6	7808
23- 0 2 1 7	7810
23- 0 2 1 8	7812
23- 0 2 1 9	7814
23- 0 2 2 0	7815
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23- 0 2 3 8	7851
23- 0 2 3 9	7852
23- 0 2 4 0	7855

Manifest No.	Scale Ticket No
23- 0 2 4 1	7856
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23- 0 2 7 6	7932
23- 0 2 7 7	8034
23- 0 2 7 8	8202
23- 0 2 7 9	8441

Manifest No.	Scale Ticket No

Manifest No.	Scale Ticket No

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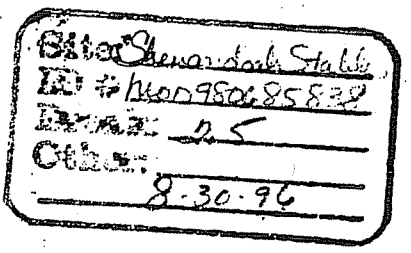
Manifest No.	Scale Ticket No

Appendix 2

Site Progress Reports
Shenandoah Stables Site

U. S. ENVIRONMENTAL PROTECTION AGENCY
SITE PROGRESS REPORT



I. HEADING

Date: August 30, 1996

Subject: Shenandoah Stables Site
Moscow Mills, Missouri

From: Ken Rapplean, OSC
U.S. EPA, Region 7

To: Paul Nadeau, Director (5203G)
Regions 5/7 Accelerated Response Center

Report #: 1

II. BACKGROUND

Site No.:	40
Delivery Order No.:	7001-0004
Response Authority:	CERCLA
NPL Status:	On NPL
State Notification:	MDNR notified
Remedial Action Status:	ROD: July 28, 1988 ROD: Sep. 28, 1990
Start Date	August 26, 1996

III. SITE INFORMATION

The Shenandoah Stables Site is located in a rural area along U.S. Highway 61 near Moscow Mills, Lincoln County, Missouri, approximately 45 miles northwest of St. Louis, Missouri. Shenandoah Stables lies in the west ½, northeast 1/4 of section 17, township 48N, range 1E of the Troy 7.5 minute USGS quadrangle. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation, and other small businesses on approximately 5 to 10 acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

The Site contains a horse arena building; the area inside the arena was sprayed with dioxin-contaminated waste oil on May 26, 1971, for dust control purposes. The contamination was spread by human and animal traffic to areas outside the arena building. In addition, the

owner at that time removed some of the contaminated soil which was placed in a slough area outside the building.

The initial sampling effort was conducted in May 1982 and confirmed the presence of dioxin at this Site. Since that time, a total of four site investigations have been conducted by the EPA and one by the U.S. Fish and Wildlife Service (USFWS). These investigations detected exterior contamination of the facility by dioxin at levels greater than 1750 parts per billion (ppb). Dioxin contamination had spread from the original sprayed area to adjoining portions of the enclosed facility and to outside areas. Sampling and analysis confirmed contamination of approximately 8600 square yards of interior and exterior site areas. In addition, the USFWS sampling identified dioxin contamination in area wildlife as high as 46 picograms/gram.

The 1988 Record of Decision (ROD) selected a remedial action involving excavation and interim onsite storage of dioxin-contaminated soils exceeding health-based levels recommended by federal and state health agencies. Excavation continued until a residual concentration of one part per billion (ppb) was reached in areas outside the arena and until a residual concentration of five to ten ppb was reached at a depth greater than two feet in the arena and slough areas. During this remedial action, decontamination of the arena building was performed to meet health agency recommendations. Implementation of this remedial action was completed in May 1989.

The ROD for the Final Management of Dioxin Contaminated Soil was issued by EPA on September 28, 1990. The ROD selected a final remedy for the contaminated materials in storage at the Shenandoah Site as thermal treatment at the Times Beach Incinerator and stated that the material stored at the Shenandoah Stable Site would be transported to Times Beach and the site restored after all dioxin-contaminated material has been removed.

IV. RESPONSE INFORMATION

A. Situation

Current Situation

The Shenandoah Stables Site is currently being used by the present owners for the boarding, training and sale of horses and for staging rodeos.

B. Planned Remedial Activities

The bags containing the dioxin-contaminated material will be placed directly into end-dump trailers and hauled to the incinerator at Times Beach. Details concerning the route and truck specifications are found in the Engineering Evaluation/Cost Analysis (EE/CA) for the St. Louis area dioxin sites issued by EPA on July 21, 1995. The transportation will be carried out consistent with the EE/CA.

Additional verification sampling has shown that two 14' x 14' grids need to be excavated for transportation to the Times Beach Site. Verification sampling will be completed during the excavation period. Transportation of excavated soils will be completed by placing the material directly into end-dump trailers and hauling it to the incinerator at Times Beach.

The 1990 ROD for the Site states that dioxin-contaminated soil and other materials will be thermally destroyed at an incineration facility at Times Beach. After the dioxin-contaminated material is transported to Times Beach, it will be thermally treated in accordance with both the 1990 ROD for this Site and 1988 ROD for the Times Beach and Minker/Stout/Romaine Creek sites.

A limited restoration of the site such as grading of roadways, fencing, etc., and any repairs to the storage buildings that occurred during the removal of the bags will be completed. The restoration of the excavated areas will be completed by placing clean backfill onto those areas. The storage buildings will be sampled after all materials are removed and transported to the Times Beach incinerator. Any building or portion of building that has dioxin contamination above health-based levels will be cleaned until resampling shows the areas are at acceptable levels.

The following description of site activities will refer to the three storage buildings as such: Building 1 is the north building of the two buildings located on the east side of the site. Building 2 is the south of those two buildings. Building 3 is located just west of the northwest corner of the arena building.

C. Remedial Activities

On August 23, 1996, I met with the Earth Tech (Dioxin Excavation and Transportation Contractor) response manager at the site to discuss schedule, site restrictions and health and safety issues. One piece of equipment was delivered to the site and then both of us went to the Bristol Steel removal site to observe bag removal technique(s). I returned to Kansas City that evening.

On Monday, August 26, 1996, I returned to the site and the removal of bags from buildings 1 and 2 was started. The following is a list of the number of bags and their weights by day that were removed from the buildings and placed onto the trucks for delivery to the Times Beach incinerator:

Date	Bags	Weight (tons)
August 26	116	271.34
August 27	114	264.37
August 28	118	316.22
August 29	219	588.65
August 30	132	365.37
Total:	699	1,805.95

On Friday, August 30, I returned to Kansas City.

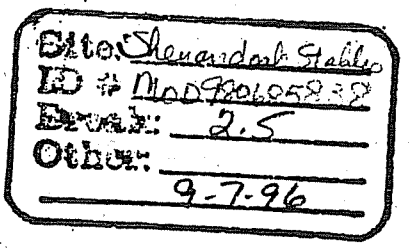
V. COST INFORMATION

The following Remedial Action costs are only estimates and may not include all costs associated with the action:

Response contractor costs:	$ 38,072
START contractor costs:	$ 3,000
Extramural costs:	$ 2,025
Intramural costs:	$ 4,725
TOTAL:	$ 47,822

cc: Dennis Grams, P.E., RGAD
Awilda Fuentes, 5203G
Michael J. Sanderson, SUPR
Ken Buchholz, EFLR
Hattie Thomas, OEP
Gary Behrns, MDNR
Jan Lambert, OEP
Martha Steincamp, CNSL
Denise Jordan-Izaguirre, ATSDR
Bob Feild, MOKS

U. S. ENVIRONMENTAL PROTECTION AGENCY
SITE PROGRESS REPORT



I. HEADING

Date: September 7, 1996

Subject: Shenandoah Stables Site
Moscow Mills, Missouri

From: Ken Rapplean, OSC
U.S. EPA, Region 7

To: Paul Nadeau, Director (5203G)
Regions 5/7 Accelerated Response Center

Report #: 2

II. BACKGROUND

Site No.:	40
Delivery Order No.:	7001-0004
Response Authority:	CERCLA
NPL Status:	On NPL
State Notification:	MDNR notified
Remedial Action Status:	ROD: July 28, 1988
	ROD: Sep. 28, 1990
Start Date	August 26, 1996

III. SITE INFORMATION

The Shenandoah Stables Site is located in a rural area along U.S. Highway 61 near Moscow Mills, Lincoln County, Missouri, approximately 45 miles northwest of St. Louis, Missouri. Shenandoah Stables lies in the west ½, northeast 1/4 of section 17, township 48N, range 1E of the Troy 7.5 minute USGS quadrangle. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation and other small businesses on approximately 5 to 10 acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

The Site contains a horse arena building; the area inside the arena was sprayed with dioxin-contaminated waste oil on May 26, 1971, for dust control purposes. The contamination was spread by human and animal traffic to areas outside the arena building. In addition, the

owner at that time removed some of the contaminated soil which was placed in a slough area outside the building.

The initial sampling effort was conducted in May 1982 and confirmed the presence of dioxin at this Site. Since that time, a total of four site investigations have been conducted by the EPA and one by the U.S. Fish and Wildlife Service (USFWS). These investigations detected exterior contamination of the facility by dioxin at levels greater than 1750 parts per billion (ppb). Dioxin contamination had spread from the original sprayed area to adjoining portions of the enclosed facility and to outside areas. Sampling and analysis confirmed contamination of approximately 8600 square yards of interior and exterior site areas. In addition, the USFWS sampling identified dioxin contamination in area wildlife as high as 46 picograms/gram.

The 1988 Record of Decision (ROD) selected a remedial action involving excavation and interim onsite storage of dioxin-contaminated soils exceeding health-based levels recommended by Federal and State health Agencies. Excavation continued until a residual concentration of one part per billion (ppb) was reached in areas outside the arena and until a residual concentration of five to ten ppb was reached at a depth greater than two feet in the arena and slough areas. During this remedial action, decontamination of the arena building was performed to meet health agency recommendations. Implementation of this remedial action was completed in May 1989.

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IV. RESPONSE INFORMATION

A. Situation

Current Situation

The Shenandoah Stables Site is currently being used by the present owners for the boarding, training and sale of horses and for staging rodeos.

B. Planned Remedial Activities

The bags containing the dioxin-contaminated material will be placed directly into end-dump trailers and hauled to the incinerator at Times Beach. Details concerning the route and truck specifications are found in the Engineering Evaluation/Cost Analysis (EE/CA) for the St. Louis area dioxin sites issued by EPA on July 21, 1995. The transportation will be carried out consistent with the EE/CA.

Additional verification sampling has shown that two 14' x 14' grids need to be excavated for transportation to the Times Beach Site. Verification sampling will be completed during the excavation period. Transportation of excavated soils will be completed by placing the material directly into end-dump trailers and hauling it to the incinerator at Times Beach.

The 1990 ROD for the Site states that dioxin-contaminated soil and other materials will be thermally destroyed at an incineration facility at Times Beach. After the dioxin contaminated material is transported to Times Beach, it will be thermally treated in accordance with both the 1990 ROD for this Site and 1988 ROD for the Times Beach and Minker/Stout/Romaine Creek sites.

A limited restoration of the site such as grading of roadways, fencing, etc., and any repairs to the storage buildings that occurred during the removal of the bags will be completed. The restoration of the excavated areas will be completed by placing clean backfill onto those areas. The storage buildings will be sampled after all materials are removed and transported to the Times Beach incinerator. Any building or portion of building that has dioxin contamination above health-based levels will be cleaned until resampling shows the areas are at acceptable levels.

The following description of site activities will refer to the three storage buildings as such: Building 1 is the north building of the two buildings located on the east side of the site. Building 2 is the south of those two buildings. Building 3 is located just west of the northwest corner of the arena building.

C. Remedial Activities

On Monday, September 2, 1996, I traveled to the site. No on site work was completed due to the holiday.

On Tuesday, September 3, 1996, Doug Halewood was on site for Earth Tech as response manager. Removal of bags from Buildings 1 and 2 continued. I informed the response manager that air monitoring outside Building 1 measured 3.01 nanograms/cubic meter last week and that the building needed to be swept by personnel with respirators in order to keep the dust to a minimum.

On Wednesday, September 4, 1996, two light banks were moved onto the site to aid in early morning work.

On Thursday, September 5, 1996, approximately 250 tons of crushed rock was received to build an access road to Building 3. This information was transmitted to Phyllis Ayers in EPA Contracts.

On Friday, September 6, 1996, EPA Contracts approved Earth Tech for the additional

line item to the contract for placement of the crushed rock for the road into Building 3.

On Saturday, September 7, 1996, the Earth Tech response manager drove the boom truck out of the site to cool down the radiator at an outside water spigot at the southeast corner of the arena. Chris Skiles of ATI was on site and observed the incident. I sampled the area to determine if any contamination was transported and deposited in that area. All bags are now out of both Buildings 1 and 2. The response contractor will decontaminate the tracks of the backhoe and boom truck in order to move to Building 3. Cleaning and sweeping on Building 1 was worked on. I returned to Kansas City in the evening.

The following is a list of the number of bags and their weights by day that were removed from the buildings and placed onto the trucks for delivery to the Times Beach incinerator:

Date	Bags	Weight (tons)
September 3	217	585.11
September 4	208	541.14
September 5	207	534.53
September 6	224	604.63
September 7	129	323.26
Subtotal:	985	2,588.67
Total for project:	1684	4,394.70

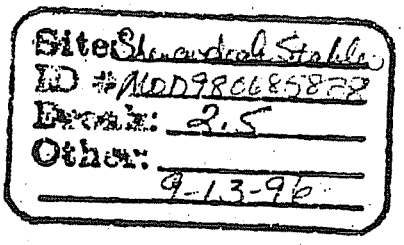
V. COST INFORMATION

The following Remedial Action costs are only estimates and may not include all costs associated with the action:

Response contractor costs:	$ 92,645
START contractor costs:	$ 5,500
Extramural costs:	$ 4,200
Intramural costs:	$ 9,800
TOTAL:	$112,145

cc: Dennis Grams, P.E., RGAD
Awilda Fuentes, 5203G
Michael J. Sanderson, SUPR
Ken Buchholz, EFLR
Hattie Thomas, OEP
Gary Behrns, MDNR
Jan Lambert, OEP
Martha Steincamp, CNSL
Denise Jordan-Izaguirre, ATSDR
Bob Feild, MOKS

U. S. ENVIRONMENTAL PROTECTION AGENCY
SITE PROGRESS REPORT



I. HEADING

Date: September 13, 1996

Subject: Shenandoah Stables Site
Moscow Mills, Missouri

From: Ken Rapplean, OSC
U.S. EPA, Region 7

To: Paul Nadeau, Director (5203G)
Regions 5/7 Accelerated Response Center

Report #: 3

II. BACKGROUND

Site No.:	40
Delivery Order No.:	7001-0004
Response Authority:	CERCLA
NPL Status:	On NPL
State Notification:	MDNR notified
Remedial Action Status:	ROD: July 28, 1988 ROD: Sept. 28, 1990
Start Date	August 26, 1996

III. SITE INFORMATION

The Shenandoah Stables Site is located in a rural area along U.S. Highway 61 near Moscow Mills, Lincoln County, Missouri, approximately 45 miles northwest of St. Louis, Missouri. Shenandoah Stables lies in the west ½, northeast 1/4 of section 17, township 48N, range 1E of the Troy 7.5 minute USGS quadrangle. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation and other small businesses on approximately 5 to 10 acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

The Site contains a horse arena building; the area inside the arena was sprayed with dioxin-contaminated waste oil on May 26, 1971, for dust control purposes. The contamination was spread by human and animal traffic to areas outside the arena building. In addition, the

owner at that time removed some of the contaminated soil which was placed in a slough area outside the building.

The initial sampling effort was conducted in May 1982 and confirmed the presence of dioxin at this Site. Since that time, a total of four site investigations have been conducted by the EPA and one by the U.S. Fish and Wildlife Service (USFWS). These investigations detected exterior contamination of the facility by dioxin at levels greater than 1750 parts per billion (ppb). Dioxin contamination had spread from the original sprayed area to adjoining portions of the enclosed facility and to outside areas. Sampling and analysis confirmed contamination of approximately 8600 square yards of interior and exterior site areas. In addition, the USFWS sampling identified dioxin contamination in area wildlife as high as 46 picograms/gram.

The 1988 Record of Decision (ROD) selected a remedial action involving excavation and interim onsite storage of dioxin-contaminated soils exceeding health-based levels recommended by federal and state health agencies. Excavation continued until a residual concentration of one part per billion (ppb) was reached in areas outside the arena and until a residual concentration of five to ten ppb was reached at a depth greater than two feet in the arena and slough areas. During this remedial action, decontamination of the arena building was performed to meet health agency recommendations. Implementation of this remedial action was completed in May 1989.

The ROD for the Final Management of Dioxin contaminated Soil was issued by EPA on September 28, 1990. The ROD selected a final remedy for the contaminated materials in storage at the Shenandoah Site as thermal treatment at the Times Beach Incinerator and stated that the material stored at the Shenandoah Stable site would be transported to Times Beach and the site restored after all dioxin-contaminated material has been removed.

IV. RESPONSE INFORMATION

A. Situation

Current Situation

The Shenandoah Stables Site is currently being used by the present owners for the boarding, training and sale of horses and for staging rodeos.

B. Planned Remedial Activities

The bags containing the dioxin-contaminated material will be placed directly into end-dump trailers and hauled to the incinerator at Times Beach. Details concerning the route and truck specifications are found in the Engineering Evaluation/Cost Analysis (EE/CA) for the St. Louis area dioxin sites issued by EPA on July 21, 1995. The transportation will be carried out consistent with the EE/CA.

Additional verification sampling has shown that two 14' x 14' grids need to be excavated for transportation to the Times Beach Site. Verification sampling will be completed during the excavation period. Transportation of excavated soils will be completed by placing the material directly into end-dump trailers and hauling it to the incinerator at Times Beach.

The 1990 ROD for the Site states that dioxin-contaminated soil and other materials will be thermally destroyed at an incineration facility at Times Beach. After the dioxin-contaminated material is transported to Times Beach, it will be thermally treated in accordance with both the 1990 ROD for this Site and 1988 ROD for the Times Beach and Minker/Stout/Romaine Creek sites.

A limited restoration of the site such as grading of roadways, fencing, etc., and any repairs to the storage buildings that occurred during the removal of the bags will be completed. The restoration of the excavated areas will be completed by placing clean backfill onto those areas. The storage buildings will be sampled after all materials are removed and transported to the Times Beach incinerator. Any building or portion of building that has dioxin contamination above health-based levels will be cleaned until resampling shows that the areas are at acceptable levels.

The following description of site activities will refer to the three storage buildings as such: Building 1 is the north building of the two buildings located on the east side of the site. Building 2 is the south of those two buildings. Building 3 is located just west of the northwest corner of the arena building.

C. Remedial Activities

On Monday, September 9, 1996, I traveled to the site area. The access road to Building 3 had enough crushed rock placed to start loading trucks by 10:15am. Buildings 1 and 2 were being swept by Earth Tech personnel in level 3 protective gear.

On Tuesday, September 10, 1996, loading of bags from Building 3 continued. I picked up the EPA drill rig from Times Beach after the last truck had left the site, and parked it at the site. The drill rig was used to sample grids adjacent to areas to be excavated to determine the extent of excavation.

On Wednesday, September 11, 1996, loading of bags from Building 3 continued. The air monitor at building 3 had been switched off at about 9:30 p.m last night. The sample was invalid and a new one started. Kim Robertson the START contractor left site. Joe Parrish will help sample tomorrow.

On Thursday, September 12, 1996, all bags had been removed from Building 3 and the last truck was shipped at 5:30 p.m. Equipment will be decontaminated tomorrow and some will

be sent to Quail Run. Three grids were sampled with the drill rig. Joe Parrish, the START contractor, helped sample. The two areas will be excavated next Monday.

On Friday, September 13, 1996, Earth Tech decontaminated the loadall and forklift and they were picked up to be taken to Quail Run. Hand digging around grids 191 and 208 was done to locate the buried telephone cable. The samples taken at the southeast corner of the arena where the loadall had been taken to cool off the radiator last week were non-detect. START contractor sampled Buildings 1 and 2 and took a wipe sample from the backhoe. I returned to Kansas City in the afternoon.

The following is a list of the number of bags and their weights by day that were removed from the buildings and placed onto the trucks for delivery to the Times Beach incinerator:

Date	Bags	Weight (tons)
September 9	200	390.85
September 10	273	596.10
September 11	255	529.13
September 12	221	506.93
Subtotal:	949	2,023.01
Total for project:	2633	6,418.02

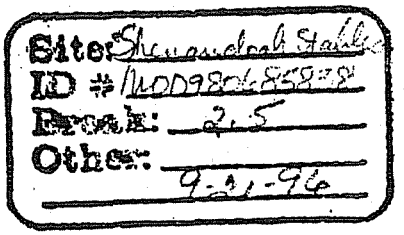
V. COST INFORMATION

The following Remedial Action costs are only estimates and may not include all costs associated with the action:

Response contractor costs:	$135,292
START contractor costs:	$ 8,000
Extramural costs:	$ 6,315
Intramural costs:	$ 14,735
TOTAL:	$164,342

cc: Dennis Grams, P.E., RGAD
Awilda Fuentes, 5203G
Michael J. Sanderson, SUPR
Ken Buchholz, EFLR
Hattie Thomas, OEP
Gary Behrns, MDNR
Jan Lambert, OEP
Martha Steincamp, CNSL
Denise Jordan-Izaguirre, ATSDR
Bob Feild, MOKS

U. S. ENVIRONMENTAL PROTECTION AGENCY
SITE PROGRESS REPORT



I. HEADING

Date: September 21, 1996

Subject: Shenandoah Stables Site
Moscow Mills, Missouri

From: Ken Rapplean, OSC
U.S. EPA, Region 7

To: Paul Nadeau, Director (5203G)
Regions 5/7 Accelerated Response Center

Report #: 4

II. BACKGROUND

Site No.:		40
Delivery Order Nos.:		7001-0004
	(Reidel)	0035-07-134
Response Authority:		CERCLA
NPL Status:		On NPL
State Notification:		MDNR notified
Remedial Action Status:		ROD: July 28, 1988
		ROD: Sept. 28, 1990
Start Date		August 26, 1996

III. SITE INFORMATION

The Shenandoah Stables Site is located in a rural area along U.S. Highway 61 near Moscow Mills, Lincoln County, Missouri, approximately 45 miles northwest of St. Louis, Missouri. Shenandoah Stables lies in the west ½, northeast 1/4 of section 17, township 48N, range 1E of the Troy 7.5 minute USGS quadrangle. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation and other small businesses on approximately 5 to 10 acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

The Site contains a horse arena building; the area inside the arena was sprayed with dioxin-contaminated waste oil on May 26, 1971, for dust control purposes. The contamination was spread by human and animal traffic to areas outside the arena building. In addition, the

owner at that time removed some of the contaminated soil which was placed in a slough area outside the building.

The initial sampling effort was conducted in May 1982 and confirmed the presence of dioxin at this Site. Since that time, a total of four site investigations have been conducted by the EPA and one by the U.S. Fish and Wildlife Service (USFWS). These investigations detected exterior contamination of the facility by dioxin at levels greater than 1750 parts per billion (ppb). Dioxin contamination had spread from the original sprayed area to adjoining portions of the enclosed facility and to outside areas. Sampling and analysis confirmed contamination of approximately 8600 square yards of interior and exterior site areas. In addition, the USFWS sampling identified dioxin contamination in area wildlife as high as 46 picograms/gram.

The 1988 Record of Decision (ROD) selected a remedial action involving excavation and interim onsite storage of dioxin-contaminated soils exceeding health-based levels recommended by federal and state health agencies. Excavation continued until a residual concentration of one part per billion (ppb) was reached in areas outside the arena and until a residual concentration of five to ten ppb was reached at a depth greater than two feet in the arena and slough areas. During this remedial action, decontamination of the arena building was performed to meet health agency recommendations. Implementation of this remedial action was completed in May 1989.

The ROD for the Final Management of Dioxin Contaminated Soil was issued by EPA on September 28, 1990. The ROD selected a final remedy for the contaminated materials in storage at the Shenandoah Site as thermal treatment at the Times Beach Incinerator and stated that the material stored at the Shenandoah Stable site would be transported to Times Beach and the site restored after all dioxin-contaminated material has been removed.

IV. RESPONSE INFORMATION

A. Situation

Current Situation

The Shenandoah Stables Site is currently being used by the present owners for the boarding, training and sale of horses and for staging rodeos.

B. Planned Remedial Activities

The bags containing the dioxin-contaminated material will be placed directly into end-dump trailers and hauled to the incinerator at Times Beach. Details concerning the route and truck specifications are found in the Engineering Evaluation/Cost Analysis (EE/CA) for the St. Louis area dioxin sites issued by EPA on July 21, 1995. The transportation will be carried out consistent with the EE/CA.

Additional verification sampling has shown that two 14' x 14' grids need to be excavated for transportation to the Times Beach Site. Verification sampling will be completed during the excavation period. Transportation of excavated soils will be completed by placing the material directly into end-dump trailers and hauling it to the incinerator at Times Beach.

The 1990 ROD for the Site states that dioxin-contaminated soil and other materials will be thermally destroyed at an incineration facility at Times Beach. After the dioxin-contaminated material is transported to Times Beach, it will be thermally treated in accordance with both the 1990 ROD for this Site and 1988 ROD for the Times Beach and Minker/Stout/Romaine Creek sites.

A limited restoration of the site such as grading of roadways, fencing, etc., and any repairs to the storage buildings that occurred during the removal of the bags will be completed. The restoration of the excavated areas will be completed by placing clean backfill onto those areas. The storage buildings will be sampled after all materials are removed and transported to the Times Beach incinerator. Any building or portion of building that has dioxin contamination above health-based levels will be cleaned until resampling shows the areas are at acceptable levels.

The following description of site activities will refer to the three storage buildings as such: Building 1 is the north building of the two buildings located on the east side of the site. Building 2 is the south of those two buildings. Building 3 is located just west of the northwest corner of the arena building.

C. Remedial Activities

On Monday, September 16, 1996, I traveled to the site, but heavy rains did not allow any excavation. The results of the samples taken with the drill rig around grid 191 were non-detect. Sample results from buildings 1 and 2 indicated that they needed to be washed. I went to Times Beach and drafted a Statement of Work for the ERCS contractor to clean the buildings.

On Tuesday, September 17, 1996, grids 208 and 191 were excavated and samples taken. Approximately 20 cubic yards of material was excavated into one truck and taken to Times Beach. The buried telephone cable was damaged and repair contractor was called to fix it. The backhoe bucket was decontaminated and wipe sample taken.

On Wednesday, September 18, 1996, the results of the grid samples were 1.05 ppb of dioxin at grid 191 and 0.9 ppb of dioxin at grid 208. Grid 191 had been excavated to greater than 14 inches deep and grid 208 had been excavated 6 inches deep. Both grids met removal criteria and were backfilled with clean onsite material. The ERCS delivery order had been signed and a work trailer and manlift was dropped off at the site late in the afternoon.

On Thursday, September 19, 1996, washing of Building 1 was initiated. The wipe sample from the backhoe bucket was non-detect.

On Friday, September 20, 1996, the pressure washing of Buildings 1 and 2 were completed. The wash water was vacuumed into a tank truck licensed to haul hazardous substances. Building 3 was sealed in preparation for washing. Building 1 was sampled. I returned to Kansas City.

On Saturday, September 21, 1996, the tank truck was manifested and wash water from the cleaning delivered to Times Beach for disposal.

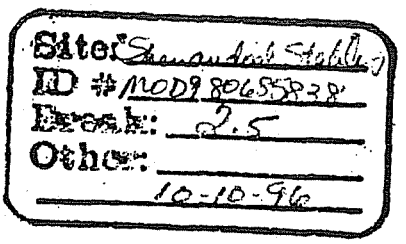
V. COST INFORMATION

The following Remedial Action costs are only estimates and may not include all costs associated with the action:

Response contractor costs:	$136,100
ERCS contractor costs:	$ 6,978
START contractor costs:	$ 13,000
Extramural costs:	$ 7,845
Intramural costs:	$ 18,305
TOTAL:	$182,228

cc: Dennis Grams, P.E., RGAD
Awilda Fuentes, 5203G
Michael J. Sanderson, SUPR
Ken Buchholz, EFLR
Hattie Thomas, OEP
Gary Behrns, MDNR
Jan Lambert, OEP
Martha Steincamp, CNSL
Denise Jordan-Izaguirre, ATSDR
Bob Feild, MOKS

U. S. ENVIRONMENTAL PROTECTION AGENCY
SITE PROGRESS REPORT



I. HEADING

Date: October 10, 1996

Subject: Shenandoah Stables Site
Moscow Mills, Missouri

From: Ken Rapplean, OSC
U.S. EPA, Region 7

To: Paul Nadeau, Director (5203G)
Regions 5/7 Accelerated Response Center

Report #: 5 and Final

II. BACKGROUND

Site No.:		40
Delivery Order Nos.:		7001-0004
	(Reidel)	0035-07-134
Response Authority:		CERCLA
NPL Status:		On NPL
State Notification:		MDNR notified
Remedial Action Status:		ROD: July 28, 1988
		ROD: Sept. 28, 1990
Start Date		August 26, 1996
Demobilization Date		October 1, 1996
Completion Date		October 10, 1996

III. SITE INFORMATION

The Shenandoah Stables Site is located in a rural area along U.S. Highway 61 near Moscow Mills, Lincoln County, Missouri, approximately 45 miles northwest of St. Louis, Missouri. Shenandoah Stables lies in the west ½, northeast 1/4 of section 17, township 48N, range 1E of the Troy 7.5 minute USGS quadrangle. The property lies on the upper flood plain terrace of Crooked Creek in a primarily agricultural area. There are a number of single family residences, a livestock operation and other small businesses on approximately 5 to 10 acre parcels around the facility. The predominant land use is pasture land which is primarily vegetated with fescue.

The Site contains a horse arena building; the area inside the arena was sprayed with dioxin-contaminated waste oil on May 26, 1971, for dust control purposes. The contamination

was spread by human and animal traffic to areas outside the arena building. In addition, the owner at that time removed some of the contaminated soil which was placed in a slough area outside the building.

The initial sampling effort was conducted in May 1982 and confirmed the presence of dioxin at this Site. Since that time, a total of four site investigations have been conducted by the EPA and one by the U.S. Fish and Wildlife Service (USFWS). These investigations detected exterior contamination of the facility by dioxin at levels greater than 1750 parts per billion (ppb). Dioxin contamination had spread from the original sprayed area to adjoining portions of the enclosed facility and to outside areas. Sampling and analysis confirmed contamination of approximately 8600 square yards of interior and exterior site areas. In addition, the USFWS sampling identified dioxin contamination in area wildlife as high as 46 picograms/gram.

The 1988 Record of Decision (ROD) selected a remedial action involving excavation and interim onsite storage of dioxin-contaminated soils exceeding health-based levels recommended by federal and state health agencies. Excavation continued until a residual concentration of one part per billion (ppb) was reached in areas outside the arena and until a residual concentration of five to ten ppb was reached at a depth greater than two feet in the arena and slough areas. During this remedial action, decontamination of the arena building was performed to meet health agency recommendations. Implementation of this remedial action was completed in May 1989.

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IV. RESPONSE INFORMATION

A. Situation

Current Situation

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B. Planned Remedial Activities

The bags containing the dioxin-contaminated material will be placed directly into end-dump trailers and hauled to the incinerator at Times Beach. Details concerning the route and truck specifications are found in the Engineering Evaluation/Cost Analysis (EE/CA) for the St. Louis area dioxin sites issued by EPA on July 21, 1995. The transportation will be carried out consistent with the EE/CA.

Additional verification sampling has shown that two 14' x 14' grids need to be excavated for transportation to the Times Beach Site. Verification sampling will be completed during the excavation period. Transportation of excavated soils will be completed by placing the material directly into end-dump trailers and hauling it to the incinerator at Times Beach.

The 1990 ROD for the Site states that dioxin-contaminated soil and other materials will be thermally destroyed at an incineration facility at Times Beach. After the dioxin-contaminated material is transported to Times Beach, it will be thermally treated in accordance with both the 1990 ROD for this Site and 1988 ROD for the Times Beach and Minker/Stout/Romaine Creek sites.

A limited restoration of the site such as grading of roadways, fencing, etc., and any repairs to the storage buildings that occurred during the removal of the bags will be completed. The restoration of the excavated areas will be completed by placing clean backfill onto those areas. The storage buildings will be sampled after all materials are removed and transported to the Times Beach incinerator. Any building or portion of building that has dioxin contamination above health-based levels will be cleaned until resampling shows the areas are at acceptable levels.

The following description of site activities will refer to the three storage buildings as such: Building 1 is the north building of the two buildings located on the east side of the site. Building 2 is the south of those two buildings. Building 3 is located just west of the northwest corner of the arena building.

C. Remedial Activities

On Monday, September 23, 1996, I traveled to the site from Kansas City. ERCS contractor completed power washing Building 3. Results of sampling from Building 1 were non-detect with some invalids. The START contractor sampled Building 2 and outside the doors on the asphalt ramps at Buildings 1 and 2.

On Tuesday, September 24, 1996, the START contractor sampled Building 3. No work was completed by the ERCS contractor.

On Wednesday, September 25, 1996, the results of the sampling on the asphalt contained several invalid results. The results indicated that the floor of Building 2 needed to be rewashed and the ramps outside the doors to Buildings 1 and 2 needed to be washed. I called the ERCS contractor and told him the results and to plan to rewash the floor of Building 2 tomorrow. I discussed the high percentage of invalid samples with Bob Jackson and Andrea Jirka and a decision was made to ship the remainder of samples from the St. Louis laboratory to the EPA laboratory. The START contractor was contacted to ship the samples to the EPA laboratory. I drove the EPA drill rig back to Times Beach and returned to Kansas City.

On Thursday, September 26, 1996, ERCS rewashed Building 2. An addendum to the ERCS work order was needed for them to work on areas outside the building. Heavy rains washed the ramp areas outside of the buildings.

On Monday, September 30, 1996, the results of all the buildings and the ramp areas were non-detect and the ERCS contractor was contacted to demobilize all of the equipment on the site. The START contractor will sample the soil just off the asphalt pavement in front of Buildings 1 and 2 to check if any contamination had run off the paved areas.

On Tuesday, October 1, 1996, the tank truck was manifested and wash water from the cleaning operations was delivered to Times Beach for disposal.

On Wednesday, October 2, 1996, the results of the soil samples in front of Buildings 1 and 2 were non-detect. The site is now ready for a final inspection.

On Thursday, October 10, 1996, Steve Sanders of EPA and myself traveled to the site and met with the owners and Valery Garret of MDNR to inspect the site. All contaminated materials have been removed from the three storage buildings. The response contractor (Earth Tech) is working on repairing the sign that was damaged by their equipment.

V. COST INFORMATION

The following Remedial Action costs are only estimates and may not include all costs associated with the action:

Response contractor costs:	$136,100
ERCS contractor costs:	$ 15,000
START contractor costs:	$ 17,000
Extramural costs:	$ 9,495
Intramural costs:	$ 22,155
TOTAL:	$199,750

cc: Dennis Grams, P.E., RGAD
Awilda Fuentes, 5203G
Michael J. Sanderson, SUPR
Ken Buchholz, EFLR
Hattie Thomas, OEP
Gary Behrns, MDNR
Jan Lambert, OEP
Martha Steincamp, CNSL
Denise Jordan-Izaguirre, ATSDR
Bob Feild, MOKS

EPA REGION 7 SUPERFUND SITE FILING FORM

Site Name: Menendez Stables EPA ID#: MOD980685838 SSID # 0740

OU # (if none, put 00): 02

Person Submitting the Record: P Sanek Telephone #: 7679 Date Submitted: 9/8/09

Branch/Office: ☐ IANE; ☒ MOKS ☐ SPEB; ☐ STAR; ☐ ERNB; ☐ ERSB; ☐ SDDD; ☐ CNSL; ☐ OPA

Number of Records Being Submitted: _____

Special Instructions: ☐ Filing/Indexing: _____
☐ This is a Final Copy of Document, remove and recycle/destroy draft copy.
☐ This is a Sensitive Document(s), place in Red Folder.
☐ CD w/ PDF file attached (note: upload into SDMS)

Original RA Report for OU 2

* Not found in SDMS *

All documents are arranged chronologically by operable unit. This form must accompany all document(s) to be filed.

Place below a √ in the appropriate box, only one √ for each form and fill in the field below.

☐ **1.0 Pre-Remedial/Pre-Removal**

- ☐ 1.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals
- ☐ 1.2 Hazard Ranking System (HRS) Information
- ☐ 1.3 Federal Facilities Background (Current & Former)

☐ **2.0 Removal Response**

- ☐ 2.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals
- ☐ 2.2 Pollution Reports
- ☐ 2.3 ICS Documents (includes Incident Action Plan & ICS Form 214)

☐ **3.0 Remedial Investigation/Combined RI/FS**

- ☐ 3.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals

☐ **4.0 Feasibility Study**

- ☐ 4.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals

☐ **5.0 Record of Decision (ROD)/Proposed Plan**

☐ **6.0 Remedial Design**

- ☐ 6.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals

☐ **7.0 Remedial Action**

- ☐ 7.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals

☐ **8.0 Site Close-Out/NPL Deletions/5-Year Reviews**

☐ **9.0 Operation and Maintenance**

- ☐ 9.1 Sampling and Analysis Data, Chain of Custody and Data Transmittals

☐ **10.0 Enforcement/Orders**

- ☐ 10.1 EPA Administrative Orders, Consent Decrees, DOJ Referrals and CERCLA 120 Federal Facilities Agreements
- ☐ 10.2 Trial Documents
- ☐ 10.3 Property Access Documents
- ☐ 10.4 Internal AR Acknowledgement Form and Repository Acknowledgement Form

☐ **11.0 Potentially Responsible Party (PRP) Searches**

- ☐ 11.1 PRP Lists
- ☐ 11.2 Individual PRP Files
- ☐ 11.3 PRP Steering Committee or PRP Group

☐ **12.0 Cost Recovery**

☐ **13.0 Community Relations**

- ☐ 13.1 Mailing Lists

☐ **14.0 Congressional Relations**

☐ **15.0 Index of Documents furnished under FOIA by Superfund**

[Note: Filed chronologically by FOIA number]

☐ **16.0 Natural Resources Trustee**

17.0 Site Management Records

[Note: Closed Section - DO NOT USE]

18.0 Initial Remedial Measure (IRM) Records

[Note: Closed Section - DO NOT USE]

19.0 Resource Conservation and Recovery Act

[Note: RCRA Records, Closed Section -DO NOT USE]

☐ **20.0 Interagency Agreement (IAG)**

[Note: All documents are filed by IAG number and Chronologically]

☐ **21.0 Cooperative Agreements (CA)**

[Note: All documents are filed by CA number and Chronologically]

☐ **22.0 EPA Contractor's Related Documents**

[Note: All documents are filed by the contract number, then the work assignment number, and chronologically]

☐ **23.0 State Superfund Contracts**

[Note: All documents are filed by the contract number, then the work assignment number, and chronologically]